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eAIP

Civil Aviation Authority of Singapore

AIP AMENDMENT 06/2025

Effective date
27 NOV 2025

Publication date
27 NOV 2025

1 Significant information and changes

1.1 Singapore FIR

a) Inclusion of frequencies 135.05MHz and 134.95MHz in AIP section ENR 2.1.

b) Amendments to the point/segment remarks of the conventional navigation routes in AIP section ENR 3.2, specifically under routes L517, L625, L642, L644, L649, M753, M758, M767, M768, M771, M772, M904, N884, N891 and N892.

c) Amendments AIP section ENR 1.6 on the description of ADS-B operating procedures in ADS-B Out exclusive airspace.

d) Inclusion of FL300 on ATS route M875 – TAPIS – L509 in AIP section ENR 1.9, para 5.2.1.

1.2 Singapore Changi Airport

a) Updated AIP section AD 1.3 on the type of traffic permitted to use Changi AD to be consistent with the airspace classification.

b) Updated AD-2-WSSS-ADC-2 chart.

c) Updated ADGS display on Pre-Arrival Information.

1.3 Seletar Airport

a) Updated AIP section AD 1.3 on the type of traffic permitted to use Seletar AD to be consistent with the airspace classification.

b) Updated AD-2-WSSL-ADC-1 and AD-2-WSSL-ADC-2 charts.

2 This amendment incorporates information contained in the listed AIP Supplements and NOTAMs, which are hereby superseded:

AIP Supplements

NIL

NOTAM

A3456/2025 dated 13/10/2025

AMENDED PAGES

To be removed				To be inserted		
GEN				GEN		
	GEN 0.2-1	02 OCT 2025			GEN 0.2-1	27 NOV 2025
	GEN 0.3-1	02 OCT 2025			GEN 0.3-1	27 NOV 2025
	GEN 0.3-2	02 OCT 2025			GEN 0.3-2	27 NOV 2025
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GEN 0.2 RECORD OF AIP AMENDMENTS

AIP AMENDMENT

NR/Year	Publication Date	Effective date	Inserted by
03/2025	12 JUN 2025	12 JUN 2025	
04/2025	07 AUG 2025	07 AUG 2025	
05/2025	02 OCT 2025	02 OCT 2025	
06/2025	27 NOV 2025	27 NOV 2025	

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GEN 0.3 RECORD OF CURRENT AIP SUPPLEMENTS

NR/Year	Subject	AIP section(s) affected	Period of Validity	Cancellation record
059/2020	SINGAPORE CHANGI AIRPORT – LONG TERM CLOSURE OF AIRCRAFT STAND E20 AT TERMINAL 2, SINGAPORE CHANGI AIRPORT		2020/08/25 2026/12/30	
006/2024	PAYA LEBAR AIRPORT – CRANES		2024/01/11 2025/12/31	
007/2024	PAYA LEBAR AIRPORT – LUFFING CRANES		2024/01/11 2025/12/31	
020/2024	PAYA LEBAR AIRPORT – SADDLE CRANES		2024/02/08 2025/12/31	
047/2024	PAYA LEBAR AIRPORT – LUFFING CRANES		2024/02/08 2025/12/30	
048/2024	PAYA LEBAR AIRPORT – CRANES		2024/02/08 2025/12/31	
083/2024	SINGAPORE CHANGI AIRPORT-DECOMMISSIONING OF AIRCRAFT STANDS E1 AND F30 AND TEMPORARY CLOSURE OF TAXILANES R1,R2,R3 AND AIRCRAFT STANDS E2,E3,E4,F31,F32,F33 AND F34 DUE TO CONSTRUCTION WORK ACTIVITIES AT TERMINAL 2		2024/05/09 2028/01/03	
174/2024	SINGAPORE CHANGI AIRPORT – CLOSURE OF TAXIWAYS ASSOCIATED WITH RUNWAY 02R/20L		2024/11/28 2027/12/22	
176/2024	SINGAPORE CHNAGI AIRPORT - USE OF CONSTRUCTION LASERS, LOCATIONS OF AUTOMATIC TOTAL STATIONS AND CONCRETE BLOCKS TO SUPPORT CONSTRUCTION ACTIVITIES AT TERMINAL 2		2024/10/28 2026/10/05	
178/2024	PAYA LEBAR AIRPORT – CRANES		2024/11/14 2025/12/31	
181/2024	PAYA LEBAR AIRPORT – MOBILE CRANE		2024/11/14 2025/11/30	
185/2024	PAYA LEBAR AIRPORT – MOBILE CRANE		2024/11/14 2025/12/31	
186/2024	PAYA LEBAR AIRPORT – MOBILE CRANE		2024/11/14 2025/12/31	
187/2024	PAYA LEBAR AIRPORT – LUFFER CRANES		2024/11/14 2025/12/31	
188/2024	PAYA LEBAR AIRPORT – CRANES		2024/11/14 2025/12/31	
192/2024	PAYA LEBAR AIRPORT – TOPLESS CRANES		2024/11/14 2025/11/30	
193/2024	PAYA LEBAR AIRPORT – CRAWLER TOWER CRANES		2024/11/14 2025/12/31	
194/2024	PAYA LEBAR AIRPORT – TOWER CRANES		2024/11/14 2025/12/31	
195/2024	PAYA LEBAR AIRPORT – FLAT-TOP CRANES		2024/11/14 2025/12/31	
197/2024	PAYA LEBAR AIRPORT – CRANES		2024/11/14 2025/12/15	
204/2024	PAYA LEBAR AIRPORT – CRAWLER CRANE		2024/12/12 2025/11/30	
205/2024	PAYA LEBAR AIRPORT – TOPLESS CRANES		2024/12/12 2025/11/30	

NR/Year	Subject	AIP section(s) affected	Period of Validity	Cancellation record
208/2024	PAYA LEBAR AIRPORT – CRANES		2024/12/12 2025/12/30	
209/2024	PAYA LEBAR AIRPORT – CRANES		2024/12/12 2025/12/30	
218/2024	SELETAR AIRPORT - CLOSURE OF HELICOPTER LANDING AREA		2024/12/30 2025/12/31	
002/2025	PAYA LEBAR AIRPORT – MOBILE CRANES		2025/01/24 2025/12/31	
003/2025	PAYA LEBAR AIRPORT – TRUCK CRANE		2025/01/24 2025/12/31	
004/2025	PAYA LEBAR AIRPORT – LUFFING TOWER CRANE		2025/01/24 2025/12/30	
005/2025	PAYA LEBAR AIRPORT – TOPLESS TOWER CRANES		2025/01/24 2025/12/31	
006/2025	PAYA LEBAR AIRPORT – TOWER CRANE		2025/01/24 2025/12/31	
009/2025	PAYA LEBAR AIRPORT – MOBILE CRANE		2025/01/24 2025/12/31	
010/2025	PAYA LEBAR AIRPORT – LUFFING CRANE		2025/01/24 2025/12/31	
013/2025	PAYA LEBAR AIRPORT – CRANES		2025/01/24 2025/12/14	
014/2025	PAYA LEBAR AIRPORT – MOBILE CRANE		2025/01/24 2025/12/31	
015/2025	PAYA LEBAR AIRPORT – MOBILE CRANE		2025/01/24 2025/12/31	
016/2025	PAYA LEBAR AIRPORT – FLAT TOP CRANES		2025/01/24 2025/12/31	
017/2025	PAYA LEBAR AIRPORT – LUFFING CRANES		2025/01/24 2025/12/31	
018/2025	PAYA LEBAR AIRPORT – FLAT TOP CRANES		2025/01/24 2025/12/31	
019/2025	PAYA LEBAR AIRPORT – TOWER CRANES		2025/01/24 2025/12/31	
020/2025	PAYA LEBAR AIRPORT – TOWER CRANES		2025/01/24 2025/12/31	
021/2025	PAYA LEBAR AIRPORT – LUFFER CRANES		2025/01/24 2025/12/31	
022/2025	PAYA LEBAR AIRPORT – CRANES		2025/01/24 2025/12/31	
024/2025	PAYA LEBAR AIRPORT – LUFFING CRANES		2025/02/17 2025/12/01	
025/2025	PAYA LEBAR AIRPORT – LUFFER CRANE		2025/02/17 2025/12/31	
027/2025	PAYA LEBAR AIRPORT – CRAWLER CRANES		2025/02/17 2025/12/30	
028/2025	PAYA LEBAR AIRPORT – CRANES		2025/02/17 2025/12/31	
029/2025	PAYA LEBAR AIRPORT – CRANES		2025/02/17 2025/12/31	
030/2025	PAYA LEBAR AIRPORT – TOPLESS CRANES		2025/02/17 2025/12/31	
034/2025	PAYA LEBAR AIRPORT – FLAT TOP CRANES		2025/02/17 2026/01/31	

NR/Year	Subject	AIP section(s) affected	Period of Validity	Cancellation record
036/2025	SINGAPORE CHANGI AIRPORT - STEEL AND FRANGIBLE FRAMES AND FRANGIBLE POSTS		2025/02/28 2026/01/02	
038/2025	SINGAPORE CHANGI AIRPORT – CLOSURE OF AIRCRAFT STAND 604 AT EAST CARGO APRON		2025/04/17 2026/02/19	
040/2025	PAYA LEBAR AIRPORT – MOBILE CRANE		2025/03/11 2026/03/20	
041/2025	PAYA LEBAR AIRPORT – TOWER CRANES		2025/03/11 2025/12/31	
043/2025	PAYA LEBAR AIRPORT – CRANES		2025/03/11 2026/02/12	
044/2025	PAYA LEBAR AIRPORT – CRANES		2025/03/11 2026/01/31	
045/2025	PAYA LEBAR AIRPORT – LUFFING CRANES		2025/03/11 2025/12/31	
046/2025	PAYA LEBAR AIRPORT – MOBILE CRANE		2025/03/11 2026/01/15	
047/2025	PAYA LEBAR AIRPORT – CRANES		2025/03/11 2025/12/31	
048/2025	PAYA LEBAR AIRPORT – CRANES		2025/03/11 2025/12/31	
049/2025	PAYA LEBAR AIRPORT – CRANES		2025/03/11 2026/12/31	
050/2025	PAYA LEBAR AIRPORT – CRANES		2025/04/10 2026/03/01	
051/2025	PAYA LEBAR AIRPORT – CRANES		2025/04/10 2026/03/05	
052/2025	PAYA LEBAR AIRPORT – CRANES		2025/04/10 2026/03/07	
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WSAP - PAYA LEBAR	
AD 2.WSAP-1	27 NOV 2025
AD 2.WSAP-2	12 JUN 2025
AD 2.WSAP-3	12 JUN 2025
AD 2.WSAP-4	12 JUN 2025
AD 2.WSAP-5	12 JUN 2025
AD 2.WSAP-6	27 NOV 2025
AD 2.WSAP-7	27 NOV 2025
AD 2.WSAP-8	27 NOV 2025
AD 2.WSAP-9	02 OCT 2025
AD 2.WSAP-10	02 OCT 2025
AD-2-WSAP-ADC-1-1	16 JUL 2020
AD-2-WSAP-ADC-2-1	16 JUL 2020
AD-2-WSAP-AOC-1-1	24 MAR 2022
AD-2-WSAP-IAC-1-1	20 FEB 2025
AD-2-WSAP-IAC-2-1	20 FEB 2025
AD-2-WSAP-IAC-3-1	20 FEB 2025
AD-2-WSAP-IAC-4-1	20 FEB 2025
AD-2-WSAP-IAC-5-1	20 FEB 2025
AD-2-WSAP-IAC-6-1	20 FEB 2025
WSAT - TENGAH	
AD 2.WSAT-1	27 NOV 2025
AD 2.WSAT-2	02 OCT 2025
AD 2.WSAT-3	27 NOV 2025
AD 2.WSAT-4	27 NOV 2025
AD 2.WSAT-5	12 JUN 2025
AD 2.WSAT-6	07 AUG 2025
AD-2-WSAT-ADC-1-1	17 JUN 2021
WSAG - SEMBAWANG	
AD 2.WSAG-1	27 NOV 2025
AD 2.WSAG-2	27 NOV 2025
AD 2.WSAG-3	27 NOV 2025
WMKJ - JOHOR BAHRU	
AD 2.WMKJ-1	12 JUN 2025
WIDD - BATAM/HANG NADIM (INDONESIA)	
AD 2.WIDD-1	12 JUN 2025
WIDN - TANJUNGPINANG / RAJA HAJI FISABILILLAH (INDONESIA)	
AD 2.WIDN-1	07 AUG 2025
WIDT - TANJUNG BALAI KARIMUN/ RAJA HAJI ABDULLAH (INDONESIA)	
AD 2.WIDT-1	12 JUN 2025

GEN 0.6 TABLE OF CONTENTS TO PART 1

GEN 4.2.6 QUERIES ON LEVYING/BILLING OF RANS CHARGES GEN 4.2-2

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GEN 1 NATIONAL REGULATIONS AND REQUIREMENTS

GEN 1.1 DESIGNATED AUTHORITIES

The authority responsible for civil aviation in Singapore is the Civil Aviation Authority of Singapore under the Ministry of Transport. The addresses of the designated authorities concerned with facilitation of international air navigation are as follows:

1 CIVIL AVIATION

Post:
CIVIL AVIATION AUTHORITY OF SINGAPORE
60 Airport Boulevard, #04-01, Changi Airport Terminal 2
SINGAPORE 819643
Tel: (65) 65421122
Fax: (65) 65421231
AFS: WSSSYAYX
URL: www.caas.gov.sg

2 METEOROLOGY

Post:
CIVIL AVIATION AUTHORITY OF SINGAPORE
60 Airport Boulevard, #04-01, Changi Airport Terminal 2
SINGAPORE 819643
Tel: (65) 65421122
AFS: WSSSYAYX
URL: www.caas.gov.sg

3 CUSTOMS

Post:
SINGAPORE CUSTOMS
55 Newton Road #07-01, Revenue House
SINGAPORE 307987
Tel: (65) 63552000
URL: www.customs.gov.sg

4 IMMIGRATION

Post:
IMMIGRATION & CHECKPOINTS AUTHORITY
10 Kallang Road, #08-00 ICA Building
SINGAPORE 208718
Tel: (65) 63916100
URL: www.ica.gov.sg

5 HEALTH

Post:
COMMUNICABLE DISEASES AGENCY
Acting Director Contact & Environmental Diseases, Border & Travel Health (CEBT)
238A Thomson Road, Novena Square Tower A #23-01 to 05
SINGAPORE 307684
URL: www.cda.gov.sg

Post:
MINISTRY OF HEALTH
Director Disease Response and Training Division (DTD)
1 Pasir Panjang Road, Labrador Tower
Level 21, #21-01
SINGAPORE 118479
Tel: (65) 63259220
URL: www.moh.gov.sg

6 ENROUTE AND AERODROME CHARGES

Post:

CIVIL AVIATION AUTHORITY OF SINGAPORE
60 Airport Boulevard, #04-01, Changi Airport Terminal 2
SINGAPORE 819643

Tel: (65) 65421122
Fax: (65) 65421231
AFS: WSSSYAYX

Post:

CHANGI AIRPORT GROUP (S) PTE LTD
SELETAR AIRPORT (AIRSIDE OPERATIONS)
21 Seletar Aerospace Road 1 #02-01
SINGAPORE 797405

Tel: (65) 64815077
Fax (65) 64831754

7 AGRICULTURE QUARANTINE

Post:

Head Office: ANIMAL & VETERINARY SERVICE
Singapore Botanic Gardens, 1 Cluny Road
SINGAPORE 259569

URL: www.nparks.gov.sg/avs

Post:

CHANGI ANIMAL AND PLANT QUARANTINE STATION
113A Airport Cargo Road, Changi Airfreight Centre
SINGAPORE 819985

Tel: 1800 476 1600

8 TRANSPORT SAFETY INVESTIGATION BUREAU

Post:

Director (TSIB)
MINISTRY OF TRANSPORT
c/o Changi Airport Post Office P.O. Box 1005
SINGAPORE 918155

Tel: (65) 65412797
Fax: (65) 65422394
URL: www.mot.gov.sg

– Newspapers, books and magazines
– Pre-recorded cartridges and cassettes
– Telecommunication and radio communication equipment
– Toy walkie-talkies
– Arms and explosives
– Bulletproof clothing
– Toy guns, pistols, and revolvers
– Weapons, kris, spears and swords
– Medicines and pharmaceutical products
– Poisons
– Dangerous Cargo
– Ionising Radiation (IR) irradiating apparatus & Radioactive material (e.g. x-ray equipment)
– Non-ionising Radiation (IR) irradiating apparatus (e.g. ultraviolet sunlamps)
– Telecommunication and radio communication equipment

Please visit the Immigration & Checkpoints Authority (ICA) website for more information on controlled and prohibited goods .

2 IMMIGRATION REQUIREMENTS

2.1 All passengers are required to present themselves with their travel documents, and endorsements (if necessary).

All travellers, including Singapore Citizens, Permanent Residents, Long-Term Pass holders and foreign visitors, are required to electronically submit their pre-trip health and travel history declarations to the Immigration & Checkpoints Authority (ICA) via the SG Arrival Card (SGAC) e-Service, before arriving in Singapore. This does not apply to those transiting/transferring through Singapore without seeking immigration clearance.

All travellers seeking entry into Singapore are required to comply with Singapore's border control requirements, which can be found at https://www.ica.gov.sg/enter-transit-depart.

2.2 Any person entering Singapore from a place outside Singapore, or is leaving Singapore for a place outside Singapore (including aircrew entering or leaving Singapore on functional check flights) shall present to an immigration officer at an authorised airport, a valid passport or a valid travel document recognised by the Government of Singapore (in the case of an alien, a visa for Singapore where such a visa is required) with the exception of the following persons:

a) A member of the Singapore Armed Forces travelling on duty;
b) A member of such Visiting Forces as the Minister may determine;
c) Any child or person who is included in the passport or other travel document of a parent of the child, or of a spouse or other relative of the person and is accompanying that parent, spouse or relative (as the case may be) when travelling to and leaving from Singapore.

2.3 Nationals of the following countries require visas for the purpose of social visits in Singapore (with exception of an aircrew who is an airline crew member that, in the course of a journey on duty from a place outside Singapore to Singapore, or from a place outside Singapore to a place outside Singapore, calls at an authorised airport):

– Afghanistan
– Algeria
– Bangladesh*
– Commonwealth of Independent States**
– Democratic People's Republic of Korea (North Korea)
– Egypt
– Georgia*
– India*
– Iran
– Iraq
– Jordan*
– Kosovo
– Lebanon
– Libya
– Mali
– Morocco*
– Nigeria*
– Pakistan
– Somalia

– South Sudan^
– Sudan
– Syria
– Tunisia*
– Turkmenistan*
– Ukraine*
– Yemen
– Holders of Alien's passport

Visitors holding Hong Kong Document of Identity, Macao Special Administrative Region (MSAR) Travel Permit, Palestinian Authority Passport, Refugee Travel Document**, Temporary Passport issued by United Arab Emirates, and PRC Travel Document will also require a visa to enter Singapore.

^ South Sudan has been recognised as a sovereign state, with AL2 visa to be imposed. Only the ordinary and official South Sudan TDs has been assessed to be recognised for entry.

* Commonwealth of Independent States (CIS): Armenia, Azerbaijan, Belarus, Kazakhstan, Krygyzstan, Moldova, Russia, Tajikistan, and Uzbekistan.

** Refugee Travel Documents are subjected to assessment of recognition for entry into Singapore.

Nationals of Commonwealth of Independent States (Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, and Uzbekistan), Georgia, Turkmenistan, and Ukraine may qualify for the 96-hour visa free transit facility (VFTF) provided that:

a) the person is in transit to a third country;
b) the person holds a valid passport, confirmed onward air-ticket, entry facilities (including visa) to the third country and have sufficient funds for the period of stay in Singapore;
c) the person continues his journey to the third country within 96 hours visa free period granted; and
d) the person satisfies Singapore's entry requirements.

Nationals of India, as well as Nationals of the People's Republic of China (PRC) holding other travel documents issued by the PRC^ (excluding ordinary, diplomatic, public affairs and service passports) may qualify for the 96-hour VFTF provided that:

a) the person is in transit to or from a third country via Singapore by any mode of transport and will depart via air or sea;
b) the person holds a valid passport and confirmed onward air/ferry/cruise ticket for departure from Singapore within 96 hours;
c) the person has a valid visa*/long-term pass (with a validity of at least 1 month from the date of entry into Singapore under the VFTF) issued by any of the following countries:
   – Australia
   – Canada
   – Germany
   – Japan
   – New Zealand
   – Switzerland
   – United Kingdom
   – United States of America

^ These include the PRC Travel Document, Hong Kong Special Administrative Region (SAR) Document of Identity (DOI) and Macau SAR Travel Permit.

* A visa is considered valid so long as it is issued by/ good for entry into one of the eight countries listed above. Travellers with Single Journey Visas (SJV) may still be granted VFTF on the return leg of their journey (i.e. after the SJV is used and no longer valid), but:

– the person must travel directly from the country that issued the SJV, en route through Singapore, back to their home country
– the person must not have returned to their home country since they last used the SJV.

2.4 Visitors must satisfy the following basic entry requirements before they are allowed to enter Singapore:

a) They are in possession of passports with at least 6 months' validity with assurance of their re-entry into their countries of residence or origin;
b) They have sufficient funds to last for the intended period of stay in Singapore;

c) They hold confirmed onward/return tickets and entry facilities (including visas) to their onward destinations;
d) Short-term travellers holding a passport of travel document from a visa-required country/ region must apply for a Visa; and
e) They must fulfil all prevailing public health requirements.

The granting of social visit passes to all visitors is determined by the Immigration & Checkpoints Authority (ICA) officers at the point of entry.

3 PUBLIC HEALTH REQUIREMENTS

3.1 Strict compliance with the provisions of the International Health Regulations, 2005, of the World Health Organisation, and Singapore's Infectious Diseases Act is required.

3.2 The pilot-in-command of an aircraft landing at Airports in Singapore shall furnish the Airport Health Officer with one copy of the General Declaration form (see ICAO Annex 9 Appendix 1) and one copy of the Passenger Manifest (see ICAO Annex 9 Appendix 2) signed by the pilot-in-command.

3.3 Vaccination Certificate Requirements for entry into Singapore are as follows:

A valid International Certificate of Vaccination for yellow fever is required from all travellers, including Singapore Residents, with travel history to countries with risk of yellow fever transmission (regardless of area, city or region) in the six days prior to arrival in Singapore. The certificate is valid for life, beginning from 10 days after the date of vaccination (this applies to existing and new certificates). Travellers without a valid International Certificate of Vaccination for yellow fever (e.g. unvaccinated individuals, including those who are ineligible to receive the vaccination, and travellers whose certificate has yet to become valid), are liable to be quarantined under the Infectious Diseases Act. For more details on public health requirements related to yellow fever, please refer to Singapore's Communicable Diseases Agency website (https://www.cda.gov.sg/public/diseases/yellow-fever) and Immigration & Checkpoints Authority website (https://www.ica.gov.sg/enter-transit-depart/entering-singapore/yellow-fever-vaccination-certificate).

4 FLYING LICENCES AND RATINGS

4.1 VISITING PILOTS - HOLDERS OF NON-SINGAPORE PILOT LICENCES

4.1.1 When a holder of a non-Singapore pilot's licence wishes to fly on a Singapore registered aircraft in a private capacity in Singapore, he will be required to apply for a Certificate of Validation for his foreign licence. The Certificate of Validation, if approved, will be issued for this purpose only and for a limited period. The applicant would also be required to fulfil certain conditions. Pilots who wish to apply for a Certificate of Validation should contact the Personnel Licensing Section of the Civil Aviation Authority of Singapore (see address in paragraph 4.2.2 below)

4.2 CONVERSION OF FOREIGN LICENCE TO SINGAPORE LICENCE

4.2.1 Pilots holding valid licences, including an instrument rating and/or flying instructor's rating issued by ICAO Contracting States, may be considered for the conversion of their licences under the following conditions:

a) The pilot must demonstrate formal prospective employment by a Singapore air operator, approved training organisation or flying club to operate on Singapore registered aircraft. (This requirement will not be applicable for the conversion of a foreign licence to a Singapore PPL.)
b) The pilot's foreign licence and its associated ratings must be valid from the time of application to the time of issue of a Singapore licence and its associated ratings.
c) The pilot must fulfil all conversion terms as specified by CAAS within a period of 6 months preceding the issue of a Singapore licence and its associated ratings.

Further details on the conversion of a foreign licence can be obtained from:

Safety Policy and Planning Division
Personnel Licensing Section
Civil Aviation Authority of Singapore
Singapore Changi Airport Terminal 2
South Finger Pier Level 3
Unit No. 038-039
Singapore 819643

TEL: (65) 65412482
FAX: (65) 65434941

4.3 PILOTS WHO HAVE ATTAINED THE AGE OF 65

4.3.1 Any pilot who has attained his 65th birthday shall not be permitted to act as pilot-in-command or co-pilot of an aircraft engaged in scheduled or non-scheduled international commercial air transport operations within Singapore airspace.

No	Legislation	Citation
39	Air Navigation (Protected Areas – Republic of Singapore Navy Facilities) Order 2024	S343/2024
40	Air Navigation (Protected Areas – Water Supply and Water Reclamation Plants) Order 2024	S125/2024
41	Air Navigation (Protected Areas) Order 2015	S350/2015
42	Air Navigation (Regulated Air Cargo Agents and Known Consignors) Regulations 2017	S166/2017
43	Air Navigation (Voluntary Reporting) Rules 2020	S 592/2020
44	Air Navigation (Wreck and Salvage of Aircraft) Regulations	RG 1
45	Designation of Authorised Persons	N 2
46	Use of Seletar Aerodrome	N 1
Other Acts & related legislation		
47	Carriage by Air Act 1988	
48	Carriage by Air (Parties to Conventions) Order	O 1
49	Carriage by Air (Singapore Currency Equivalents) Order	O 2
50	Carriage by Air (Montreal Convention, 1999) Act 2007	
51	Carriage by Air (Montreal Convention, 1999) (Exclusion from Convention) Order	O 1
52	Guns, Explosives and Weapons Control Act 2021	
53	Guns, Explosives and Weapons Control (Aviation Industry — Class Licence) Order 2025	S 371/2025
54	Guns, Explosives and Weapons Control (Aviation Industry — Exemption) Order 2025	S 372/2025
55	Guns, Explosives and Weapons Control (Compoundable Offences) Regulations 2025	S 384/2025
56	Tokyo Convention Act 1971	
57	Tokyo Convention (Convention Countries) Notification	N 1
58	Tokyo Convention (Protocol Countries) Notification 2019	S 893/2019
59	Hijacking of Aircraft and Protection of Aircraft and International Airports Act 1978	
60	Infrastructure Protection Act 2017	
61	Infrastructure Protection (Protected Areas) Order 2020	S 291/2020
62	Infrastructure Protection (Protected Areas) Order 2025	S 27/2025
63	Infrastructure Protection (Protected Places) (No. 10) Order 2020	S 293/2020
64	Infrastructure Protection (Protected Places) (No. 9) Order 2021	S 519/2021
65	Infrastructure Protection (Protected Places) (No. 20) Order 2024	S 790/2024
66	Infrastructure Protection (Protected Places) (No. 2) Order 2025	S 28/2025
67	International Interests in Aircraft Equipment Act 2009	
68	Immigration Act 1959	
69	Immigration (Authorised Places of Entry and Departure, and Rates) Notification 2012	S 627/2012
70	Immigration Regulations	RG 1
71	International Organisations (Immunities and Privileges) Act 1948	
72	International Organisations (Immunities and Privileges) (International Civil Aviation Organisation) Order	O 4
73	Transport Safety Investigations Act 2018	
74	Transport Safety Investigations (Aviation Occurrences) Regulations 2023	S 870/2023
75	Transport Safety Investigations (Responsible Persons – Exemption) Order 2023	S 874/2023

1.2 OTHER RELEVANT LEGISLATION

No	Legislation	Citation
1	Infectious Diseases Act 1976	
2	Infectious Diseases (Certificates of Vaccination or Other Prophylaxis) Regulations 2008	S 611/2008
3	Infectious Diseases (Quarantine) Regulations	RG 1
4	Arms Offences Act 1973	

1.3 INTERNATIONAL CONVENTIONS AND PROTOCOLS

No	Legislation
1	Convention on International Civil Aviation, done at Chicago on 7 December 1944
2	Protocol Relating to an Amendment to the Convention on International Civil Aviation [Article 83 bis], signed at Montreal on 6 October 1980
3	International Air Services Transit Agreement, signed at Chicago on 7 December 1944
4	Convention on Offences and Certain Other Acts Committed on Board Aircraft, signed at Tokyo on 14 September 1963
5	Protocol to Amend the Convention on Offences and Certain Other Acts Committed on Board Aircraft, done at Montreal on 4 April 2014
6	Convention for the Suppression of Unlawful Seizure of Aircraft, signed at The Hague on 16 December 1970
7	Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation, signed at Montreal on 23 September 1971
8	Protocol for the Suppression of Unlawful Acts of Violence at Airports Serving International Civil Aviation, Supplementary to the Convention for the Suppression of Unlawful Acts against the Safety of Civil Aviation, done at Montreal on 23 September 1971, signed at Montreal on 24 February 1988
9	Convention on the Marking of Plastic Explosives for the Purpose of Detection, signed at Montreal on 1 March 1991
10	Convention for the Unification of Certain Rules Relating to International Carriage by Air, signed at Warsaw on 12 October 1929
11	Protocol to Amend the Convention for the Unification of Certain Rules Relating to International Carriage by Air signed at Warsaw on 12 October 1929, done at The Hague on 28 September 1955
12	Montreal Protocol No. 4 to Amend the Convention for the Unification of Certain Rules Relating to International Carriage by Air, signed at Warsaw on 12 October 1929, signed at Montreal on 25 September 1975
13	Convention for the Unification of Certain Rules for International Carriage by Air, signed at Montreal on 28 May 1999
14	Convention on International interests in Mobile Equipment, signed at Cape Town on 16 November 2001
15	Protocol to the Convention on International Interests in Mobile Equipment on Matters Specific to Aircraft Equipment, signed at Cape Town on 16 November 2001
16	Protocol for the Amendment Agreement on the Joint Financing of Certain Air Navigation Services in Iceland (1956) as amended in 1982 and 2008
17	Protocol for the Amendment Agreement on the Joint Financing of Certain Air Navigation Services in Greenland (1956) as amended in 1982 and 2008
18	The International COSPAS-SARSAT Programme Agreement, done at Paris on 1 July 1988
19	Protocol Supplementary to the Convention for the Suppression of Unlawful Seizure of Aircraft, done at Beijing on 10 September 2010
20	Convention on the Suppression of Unlawful Acts Relating to International Civil Aviation, done at Beijing on 10 September 2010

2 TAXATION IN THE FIELD OF INTERNATIONAL AIR TRANSPORT

2.1 Petroleum exemptions and income tax

a) Petroleum for aircraft is granted Goods and Services Tax (GST) relief under item 11 of the Schedule to the GST (Imports Relief) Order (O 3).

b) The matter of income tax on air transport is contained within Section 12(2) and 12(2A) of the Income Tax Act 1947.

(2) Where a non-resident person carries on –

i. the business of shipowner or charterer, or

ii. the business of air transport,

and any ship or aircraft owned or chartered by the non-resident person calls at a port, an aerodrome or an airport in Singapore, the non-resident person's full profits arising from the carriage of passengers, mail, livestock or goods shipped, or loaded into an aircraft, in Singapore are deemed to accrue in Singapore.

(2A) Subsection 2 shall not apply to passengers, mail, livestock or goods which are brought to Singapore solely for transshipment, or for transfer from one aircraft to another or from an aircraft to a ship or from a ship to an aircraft.

2.2 Capital gains tax, or income on wealth, etc.

There is no capital gains tax, or income on wealth, etc., which are chargeable on the sale or use of international air transport.

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GEN 1.7 DIFFERENCES FROM ICAO STANDARDS, RECOMMENDED PRACTICES AND PROCEDURES

ANNEX 1 **Personnel Licensing**, 13th Edition

Chapter 2

2.3.3.1.2 Due to local geographical constraints and boundary, it is not possible to complete one cross-country flight totalling not less than 270km (150NM) in the course of which full- stop landings at two different aerodromes are made. In such cases, a Private Pilot Licence with restriction to fly within Singapore only will be issued.

2.8.2.1 Singapore issues two types of ratings for flying instructors: Flying Instructor Rating and Assistant Flying Instructor Rating. Both ratings meet the ICAO standards for flying instructors. Newly qualified instructors are issued with an Assistant Flying Instructor Rating, and may qualify for a Flying Instructor Rating after acquiring additional flying and instructional experience.

An Assistant Flying Instructor Rating does not entitle the holder to:

a) give flying instructions unless under the supervision of a person holding a Flying Instructor Rating; or
b) give directions in respect of the student pilot's first solo day/night flight and first solo cross-country day/night flight.

2.9.1.1 The applicant for a Commercial Pilot Licence (Gliders) shall not be less than 18 years of age.

2.10.1.1 The applicant for a Private Pilot Licence (Balloons and Airships) shall not be less than 17 years of age. The applicant for a Commercial Pilot Licence (Balloons and Airships) shall not be less than 18 years of age.

ANNEX 2 **Rules of the Air**, 11th Edition

- NIL Difference

DOC 4444 **Procedures for Air Navigation Services - Air Traffic Management,** 15th Edition (PANS-ATM)

- NIL Difference

DOC 7030 **Regional Supplementary Procedures,** 5th Edition

MID/ASIA REGIONAL SUPPLEMENTARY PROCEDURES

1.2.1 Flights shall be conducted in accordance with the Instrument Flight Rules (even when not operating in instrument meteorological conditions) when operated:

a) Above FL200.

ANNEX 3 **Meteorological Service for International Air Navigation,** 20th Edition

- NIL Difference

ANNEX 4 **Aeronautical Charts,** 11th Edition

- NIL Difference

ANNEX 5 **Units of Measurement to be used in Air and Ground Operations**, 5th Edition

- NIL Difference

ANNEX 6 **Operation of Aircraft**

Part I (International Commercial Air Transport - Aeroplanes) - 11th Edition

Chapter 12

12.4(b) Singapore regulations do not require all cabin crew to be trained on the use of automated external defibrillator (AED). However, the regulations require that at least one senior cabin crew on board every aircraft carrying AED to be trained on the use of AED.

Part II (International General Aviation - Aeroplanes) - 10th Edition
- NIL Difference

Part III (International Operations - Helicopters) - 10th Edition
- NIL Difference

ANNEX 7 **Aircraft Nationality and Registration Marks,** 6th Edition
- NIL Difference.

ANNEX 8 **Airworthiness of Aircraft,** 12th Edition
- NIL Difference

ANNEX 9 **Facilitation**, 17th Edition

Chapter 3

3.16.1 Singapore adopts an electronic visa system (e-Visa) to retrieve information to verify the identity of the visa holder.

3.29 Singapore requires all non-citizens and non residents to complete an electronic SG Arrival Card (SGAC) before/upon arrival in Singapore.

3.51 Singapore may allow the entry of an inadmissible person under special circumstances; for instance, to seek emergency medical treatment. In such cases, the airlines shall continue to be responsible for the custody and care of the passenger and eventual repatriation.

3.71 With effect from 27 Aug 2007, air crew who arrive in Singapore on crew duty and seeking temporary entry into Singapore are required to produce their passports for immigration clearance. However, their passports will not be endorsed. Crew who are nationals of countries that require visa to enter Singapore will continue to be exempted from the visa requirements if they arrive in Singapore as part of their crew duty or to join their assigned flights for the purpose of performing their crew duty.

Chapter 5

5.9.1 Under Singapore's regulations, the cost of custody and care of inadmissible persons pending their removal shall be borne by the aircraft operator.

5.18 The obligations, responsibilities, and costs associated with the removal of deportees are a shared responsibility. Singapore works closely with foreign diplomatic missions to facilitate the removal of deportees.

5.23 A valid travel document is required before any special consideration can be given to the admission of such persons. For Permanent Residents, entry permit and valid Travelling documents are required before entry is granted.

5.29 The required travel document to facilitate the return of the national will be issued upon confirmation of the person's Singapore Citizenship status.

ANNEX 10 **Aeronautical Telecommunications**

Volume I (Radio Navigation Aids) - 7th Edition

Volume II (Communication Procedures including those with PANS status) - 7th Edition

Volume III (Communication Systems) - 2nd Edition
Part I - Digital Data Communication Systems
Part II - Voice Communication Systems

Volume IV (Surveillance and Collision Avoidance Systems) - 5th Edition

Volume V (Aeronautical Radio Frequency Spectrum Utilization) - 3rd Edition

- NIL Difference

ANNEX 11 **Air Traffic Services**,15th Edition
- NIL Difference

ANNEX 12 **Search and Rescue**, 8th Edition
- NIL Difference

ANNEX 13 **Aircraft Accident and Incident Investigation**, 13th Edition
- NIL Difference

ANNEX 14 **Aerodromes**

Volume I (Aerodrome Design and Operations) - 8th Edition

Chapter 3

3.4.3 The words “wherever practicable” in Annex 14 paragraph 3.4.3 have been removed in our national regulations. Without exception, the width of the runway strip shall be 140m where the code number is 3 or 4; and 70m where the code number is 1 or 2.

Chapter 4

4.2.14 For a precision approach runway category I, the inner approach surface; inner transitional surfaces; and balked landing surface shall be established, in addition to the conical surface; inner horizontal surface; approach surface and transitional surfaces.

Chapter 6

6.1.1.6 Annex 14 paragraph 6.1.1.6(c) which states that the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day has been removed from our national regulations.

Chapter 7

7.4.1 Relating to the display of unserviceability markers, our national regulations require additionally that “unserviceability markers shall also be displayed at the entrances to a permanently or temporarily closed runway or taxiway, or part thereof”.

Chapter 9

9.2.3 Relating to the level of rescue and fire fighting protection to be provided, the remission factor has been removed from our national regulations.

Volume II (Heliports) - 5th Edition
- Not applicable

ANNEX 15 **Aeronautical Information Services**, 16th Edition
- NIL Difference

ANNEX 16 **Environmental Protection**

Volume I (Aircraft Noise) - 8th Edition

Volume II (Aircraft Engine Emissions) - 4th Edition

Volume III (Aeroplane CO? Emissions) - 1st Edition

- NIL Difference

ANNEX 17 **Aviation Security - Safeguarding International Civil Aviation Against Acts of Unlawful Interference**, 12th Edition
- NIL Difference

ANNEX 18 **The Safe Transport of Dangerous Goods by Air,** 4th Edition
- NIL Difference

ANNEX 19 **Safety Management**, 2nd Edition
- NIL Difference

GEN 2 TABLES AND CODES

GEN 2.1 MEASURING SYSTEM, AIRCRAFT MARKING, HOLIDAYS

2.1.1 UNITS OF MEASUREMENT

The table of units of measurement shown in paragraph 3.2 is used for the dissemination of information and in messages transmitted to aircraft.

2.1.2 TEMPORAL REFERENCE SYSTEM

Co-ordinated Universal Time (UTC) is used in the air traffic and communication services and in documents published for international distribution by the Aeronautical Information Service. Reporting of time is expressed to the nearest minute, e.g. 12:40:35 is reported as 1241. Local time is 8 hours ahead of UTC. Time checks to aircraft are accurate to within 30 seconds.

2.1.3 HORIZONTAL REFERENCE SYSTEM

2.1.3.1 Name/designation of system

All published geographical coordinates in the Singapore FIR indicating latitude and longitude are expressed in terms of the World Geodetic System – 1984 (WGS-84) geodetic reference datum.

2.1.3.2 Parameters of the Projection

Projection is expressed in terms of Conical Conformal Projection.

Measurement of	*Units*
Distance used in navigation, position report, etc. - generally in excess of 4000m	* Kilometres (km) or Nautical miles (NM)
Relatively short distances such as those relating to aerodromes (e.g. runway lengths)	Metres (m)
Altitudes, elevations and heights	Metres (m) or Feet (ft)
Horizontal speed including wind speed	Knots (kt)
Vertical speed	Feet per minute (ft/min)
Wind direction for landing and taking-off	Degrees Magnetic (°M)
Wind direction except for landing and taking-off	Degrees True (°T)
Visibility, including runway visual range	Metres (m) or Kilometres (km)
Altimeter Setting	Hectopascals (hPa)
Temperature	Degrees Celsius (Centigrade) (°C)
Weight	Metric tonnes (t) or kilogrammes (kg)
Time	Hours and minutes, the day of 24 hours beginning at midnight UTC (hhmm)
* International nautical miles, for which conversion into metres is given by: 1 international NM = 1852 metres	

2.1.3.3 Ellipsoid

Ellipsoid is expressed in terms of the World Geodetic System – 1984 (WGS-84) ellipsoid.

2.1.3.4 Datum

The World Geodetic System – 1984 (WGS-84) is used.

2.1.3.5 Area of application

The area of application for the published geographical coordinates coincides with the area of responsibility of the Aeronautical Information Service, i.e. the entire territory of Singapore as well as the airspace over the high seas encompassed by the Singapore Flight Information Region.

2.1.3.6 Use of an asterisk to identify published geographical coordinates

An asterisk (*) will be used to identify those published geographical coordinates which have been transformed into WGS-84 coordinates but whose accuracy of original field work does not meet the requirements in ICAO Annex 11, Chapter 2 and ICAO Annex 14, Volume I, Chapter 2. Specifications for determination and reporting of WGS-84 coordinates are given in ICAO Annex 11, Chapter 2 and ICAO Annex 14, Volume I, Chapter 2.

2.1.4 VERTICAL REFERENCE SYSTEM

2.1.4.1 Name/designation of system

The vertical reference system corresponds to mean sea level (MSL).

2.1.4.2 Geoid model

The geoid model used is the Earth Gravitational Model 1996 — (EGM-96).

2.1.5 AIRCRAFT NATIONALITY AND REGISTRATION MARKS

The nationality mark for aircraft registered in Singapore is the figure 9, followed by the letter V, i.e., 9V. The nationality mark is followed by a hyphen and a registration mark consisting of a three-letter group, e.g., 9V-BAA.

2.1.6 PUBLIC HOLIDAYS IN SINGAPORE

The following dates are notified as public holidays:

Name of Holiday	Date	Day
Christmas Day	25 December 2025	Thursday
New Year's Day	01 January 2026	Thursday
Chinese New Year	17 February 2026	Tuesday
	18 February 2026	Wednesday
Hari Raya Puasa	21 March 2026	Saturday
Good Friday	03 April 2026	Friday
Labour Day	01 May 2026	Friday
Hari Raya Haji	27 May 2026	Wednesday
Vesak Day	31 May 2026	Sunday
National Day	09 August 2026	Sunday
Deepavali	08 November 2026	Sunday
Christmas Day	25 December 2026	Friday

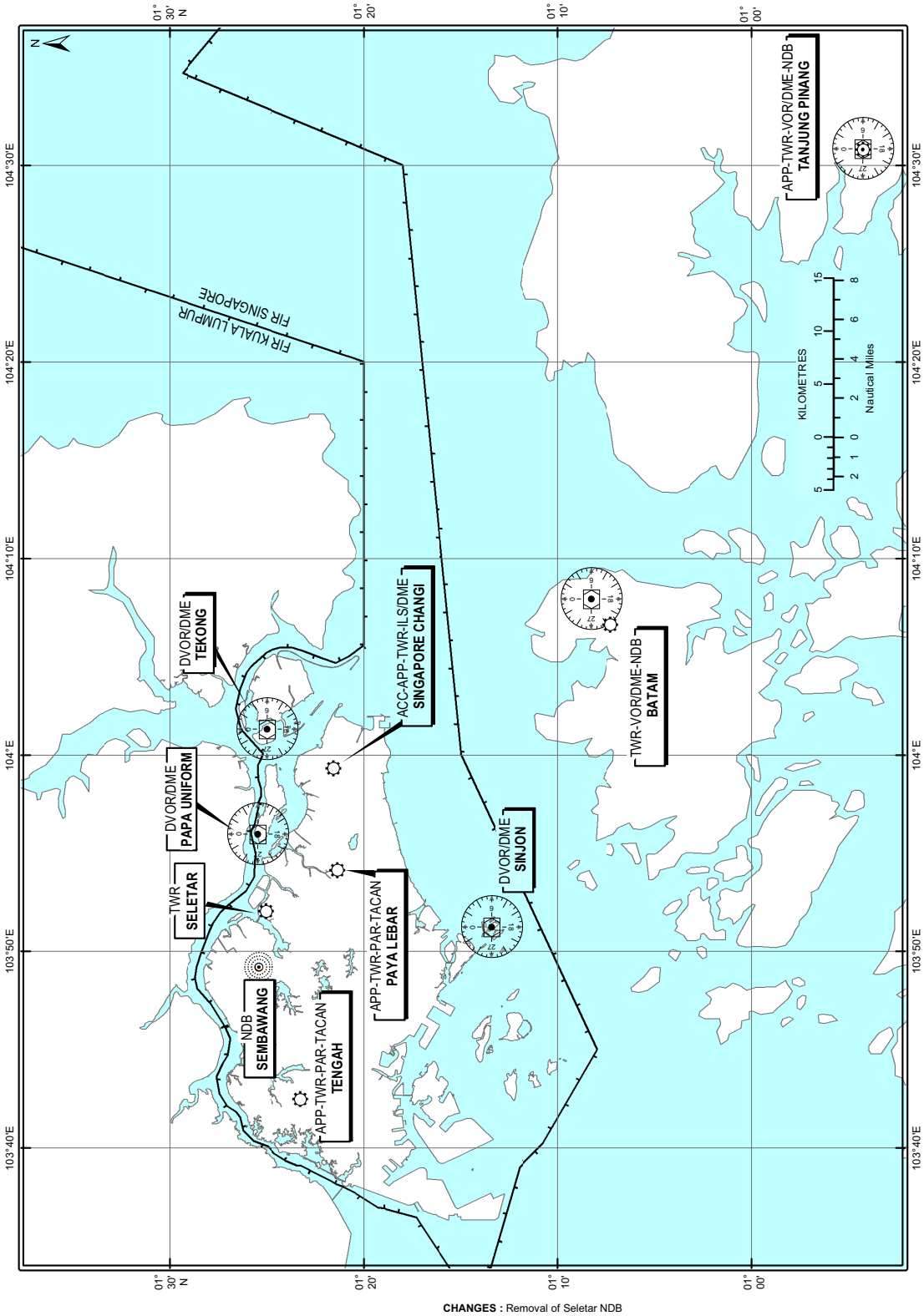
GEN 2.5 LIST OF RADIO NAVIGATION AIDS

ID	Station Name	Aid	Purpose
AG	SEMBAWANG	NDB	AE
BP	BATU PAHAT (Malaysian facility)	NDB	E
BTM	BATAM/HANG NADIM (Indonesian facility)	VOR/DME	A
ICC	SINGAPORE CHANGI	ILS/LLZ/DME	A
ICE	SINGAPORE CHANGI	ILS/LLZ/DME	A
ICH	SINGAPORE CHANGI	ILS/LLZ/DME	A
ICW	SINGAPORE CHANGI	ILS/LLZ/DME	A
PU	PAPA UNIFORM	DVOR/DME	AE
SJ	SINJON	DVOR/DME	E
TPG	TANJUNGPINANG/ RAJA HAJI FISABILILAH (Indonesian facility)	VOR/DME	A
VJB	JOHOR BAHRU (Malaysian Facility)	DVOR/DME	E
VMR	MERSING (Malaysian Facility)	DVOR/DME	E
VTK	TEKONG	DVOR/DME	AE

Station Name	Aid	ID	Purpose
BATAM/HANG NADIM (Indonesian facility)	VOR/DME	BTM	A
BATU PAHAT (Malaysian facility)	NDB	BP	E
JOHOR BAHRU (Malaysian Facility)	DVOR/DME	VJB	E
MERSING (Malaysian Facility)	DVOR/DME	VMR	E
PAPA UNIFORM	DVOR/DME	PU	AE
SEMBAWANG	NDB	AG	AE
SINGAPORE CHANGI	ILS/LLZ/DME	ICC	A
SINGAPORE CHANGI	ILS/LLZ/DME	ICE	A
SINGAPORE CHANGI	ILS/LLZ/DME	ICH	A
SINGAPORE CHANGI	ILS/LLZ/DME	ICW	A
SINJON	DVOR/DME	SJ	E
TANJUNGPINANG/RAJA HAJI FISABILILLAH (Indonesian facility)	VOR/DME	TPG	A
TEKONG	DVOR/DME	VTK	AE

Note: Purpose (A=Aerodrome, E=Enroute)

SINGAPORE
RADIO FACILITY INDEX CHART



CHANGES : Removal of Seletar NDB

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GEN 3 SERVICES

GEN 3.1 AERONAUTICAL INFORMATION SERVICES

3.1.1 RESPONSIBLE SERVICE

3.1.1.1 Aeronautical Information Services is a unit of the Air Traffic Services Division of the Civil Aviation Authority of Singapore which ensures the flow of information necessary for the safety, regularity and efficiency of international and national air navigation within the area of its responsibility as indicated under paragraph 2 below. It consists of the AIS Headquarters and International NOTAM Office (NOF). Changi and Seletar AIS Aerodrome units operate 24 hours at the same location.

3.1.1.2 AIS Headquarters

Post:	Aeronautical Information Services Civil Aviation Authority of Singapore 60 Airport Boulevard, #04-01, Changi Airport Terminal 2 Singapore 918141
Tel:	(65) 64227036
Fax:	(65) 64410221
E-mail:	caas_singaporeais@caas.gov.sg

3.1.1.3 International NOTAM office (NOF) and Changi and Seletar AIS Aerodrome Units

Post:	Singapore Air Traffic Control Centre (SATCC) 60 Biggin Hill Road Singapore 509950
Tel:	(65) 65956056 (Duty Supervisor)
Tel:	(65) 65956053 (NOF)
AFS:	WSSSYNYX (NOF)
Tel:	(65) 65956052 (Changi FPL Officer)
Fax:	(65) 65431826 (Changi AIS)
AFS:	WSSSZPZX (Changi AIS)
Tel:	(65) 64812909 (Seletar FPL Officer)
Fax:	(65) 64833044 (Seletar AIS)
AFS:	WSSLZPZX (Seletar AIS)

The service is provided in accordance with the provisions contained in ICAO Annex 15 - Aeronautical Information Services and the guidance material in the Aeronautical Information Services Manual (Doc 8126 - AN/872).

3.1.2 AREA OF RESPONSIBILITY

3.1.2.1 Aeronautical Information Services is responsible for the collection and dissemination of information for the entire territory of Singapore and for the airspace over the high seas encompassed by the Singapore Flight Information Region.

3.1.2.2 For the following airspace within Jakarta FIR, AIS is jointly provided by Indonesia and Singapore:

The area bounded by 031727N 1052959E 012450N 1061648E 001030N 1045656E 000000N 1050340E 000000N 1044330E thence around the arc of a circle radius 90 NM centred on 011324N 1035124E to 013430N 1022353E 011300N 1033000E 011408N 1033142E 011200N 1033900E 011046N 1034015E 010800N 1034500E 011500N 1040000E 011800N 1043000E 012921N 1043441E 011947N 1044606E 021838N 1052205E 023641N 1051311E 024348N 1050854E 025010N 1051210E 031453N 1052619E 031727N 1052959E excluding the Tanjungpinang Terminal Control Area (TMA) and Control Zone (CTR).

Vertical limit: SFC to FL370

3.1.3 AERONAUTICAL PUBLICATIONS

3.1.3.1 Aeronautical information is provided in the form of Aeronautical Information Products containing the following elements:

Aeronautical Information Publication (AIP) and related amendment service;
AIP Supplement (AIP SUP);
Notice to Airmen (NOTAM) and Pre-flight Information Bulletins (PIB);
Aeronautical Information Circulars (AIC); and
Aeronautical Charts

NOTAM and related monthly checklists are disseminated via the AFS and PIB via internet. All the other elements of the Aeronautical Information Products can be retrieved from AIM-SG URL at https://aim-sg.caas.gov.sg.

3.1.3.2 **Aeronautical Information Publication (AIP)**

AIP Singapore is the basic aeronautical information document published for the Republic of Singapore and contains information of a lasting character essential to air navigation. It is available in English only. It is maintained up-to-date by a regular amendment service.

3.1.3.3 **Amendment service to the AIP (AIP AMDT)**

AIP AMDT is published in accordance with the established regular intervals (see GEN 0.1-2 paragraph 3.2). It incorporates permanent changes to the AIP on the indicated publication date.

A brief description of the amendments and changes made are provided in the AIP AMDT cover page.

Each AIP AMDT cover page also includes references to the serial numbers of those elements, if any, of the Integrated Aeronautical Information Package which have been incorporated into the AIP by the amendment.

Each AIP AMDT is allocated a serial number which is consecutive and based on the calendar year. The year, indicated by two digits, is a part of the serial number of the AIP AMDT.

3.1.3.4 **AIP Supplement (AIP SUP)**

Temporary changes of long duration (3 months or more) and information of short duration which contains extensive text and/or graphics, supplementing the permanent information contained in the AIP, are published as AIP SUP. Operationally significant changes to the AIP are published in accordance with the AIRAC system and its established effective dates, and are identified clearly by the acronym AIRAC.

Each AIP SUP (regular or AIRAC) is allocated a serial number which is consecutive and based on the calendar year.

An AIP SUP is kept as long as all or some of its contents remain valid. The period of validity of the information contained in the AIP SUP will normally be given in the AIP SUP itself. Alternatively, NOTAM may be used to indicate changes to the period of validity or cancellation of the AIP SUP.

The checklist of current AIP SUP is published in the monthly plain-language NOTAM List.

3.1.3.5 **NOTAM and Pre-flight Information Bulletins (PIB)**

A NOTAM contains information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel engaged in flight operations. Each NOTAM contains information in the order shown in the ICAO NOTAM format and is composed of abbreviated phraseology assigned to the ICAO NOTAM code complemented by ICAO abbreviations, indicators, identifiers, designators, callsigns, frequencies, figures and plain language. NOTAM originated and issued for Singapore FIR and the airspace within Jakarta FIR where AIS is jointly provided by Indonesia and Singapore are distributed in ‘A’ series.

NOTAM are published as and when necessary to disseminate information of direct operational significance which:

a) is of an ephemeral nature;
b) requires advance distribution; or
c) is appropriate to the AIP but needs immediate dissemination.

Each NOTAM is assigned a 4-digit serial number preceded by the letter 'A' indicating the series, followed by a stroke and 2 digits indicating the year of issue. The serial numbers begin with 0001 every year. A checklist of current NOTAMs is issued every month via the AFS. Additionally, a monthly plain language list of valid NOTAM, including indications of the latest AIP Amendment, AIP Supplement, AIC issued and a checklist of current AIP Supplements is also retrievable online at https://aim-sg.caas.gov.sg

NOTAM are exchanged with other International NOTAM offices (NOF) as follows:

NOTAM exchanged with other NOF (R=Received only, S=Sent only, EAD=Received from/Sent to European AIS Database)		
Abu Dhabi	Jakarta	Paro (R)
Addis Ababa	Jeddah	Phnom Penh (R)
Almaty (EAD)	Johannesburg	Plaisance
Amman (EAD)	Kabul	Port Moresby
Amsterdam (EAD)	Karachi	Praha (S)
Ankara (EAD)	Kathmandu	Pyongyang
Antananarivo	Khartoum (R)	Riga (EAD)
Athinai	Kobenhavn (EAD)	Roma
Baghdad	Kolkata	Sanaa
Bahrain	Kuala Lumpur	Sarajevo (S)
Baku (EAD)	Kuwait	Seoul
Bangkok	Kyiv (EAD)	Shannon (EAD)
Beijing	Lisboa (EAD)	Sofia
Beograd (EAD)	Ljubljana (EAD)	Stockholm (EAD)
Brasilia (S)	Lobamba (R)	Taipei
Brazzaville (R)	London (EAD)	Tallinn (EAD)
Brunei	Luqa (EAD)	Tbilisi (EAD)
Bruxelles (EAD)	Macao	Tehran
Bucuresti (EAD)	Madrid (EAD)	Tel Aviv
Budapest (EAD)	Mahe	Tirana (EAD)
Cairo (S)	Male	Tokyo
Canberra	Manila (EAD)	Tripoli
Chennai	Maseru (R)	Vientiane
Christchurch	Minsk (EAD)	Vilnius (EAD)
Colombo	Moskva	Warsaw (S)(EAD)
Damascus (R)	Mumbai	Washington
Dar es-Salaam(R)	Muscat	Wien (EAD)
Dhaka	Nadi	Windhoek (R)
Frankfurt (EAD)	Nairobi	Yangon
Hanoi	New Delhi	Yerevan (S) (EAD)
Harare	Nicosia (EAD)	Zagreb (EAD)
Helsinki (EAD)	Ottawa	Zurich
Hong Kong	Paris (EAD)	

SNOWTAM

Series S (SNOWTAM) comprises information concerning the presence or cessation of hazardous conditions due to snow, ice, slush, frost, standing water or water associated with snow, slush, ice or frost on the movement area.

SNOWTAM is issued for Singapore Changi Airport and Seletar Airport in accordance with ICAO PANS-AIM (Doc 10066), Appendix 4 by the International NOTAM Office (NOF).

Pre-flight Information Bulletin (PIB), a recapitulation of valid NOTAM in plain language, can be retrieved from AIM-SG URL: https://aim-sg.caas.gov.sg

3.1.3.6 **Aeronautical Information Circular (AIC)**

Aeronautical Information Circular (AIC) contains information on the long-term forecast of major change in legislation, regulations, procedures or facilities; information of a purely explanatory or advisory nature liable to affect flight safety; and information or notification of an explanatory or advisory nature concerning technical, legislative or purely administrative matters which is inappropriate to the AIP or NOTAM, and is published as required.

Each AIC is numbered consecutively on a calendar year basis. The year, indicated by 2 digits, is a part of the serial number of the AIC. A checklist of current AIC is issued in the form of an AIC once a year.

3.1.3.7 **Aeronautical Charts**

Aeronautical charts are a visual representation of a portion of the Earth specifically designated to meet the needs of air navigation.

3.1.3.8 **Sale of publications**

The Aeronautical Information Products can be accessed freely via AIM-SG URL: https://aim-sg.caas.gov.sg.

3.1.4 AIRAC SYSTEM

3.1.4.1 In order to control and regulate operationally significant changes requiring amendments to charts, route manuals, etc., such changes, whenever possible, will be issued on predetermined dates according to the AIRAC SYSTEM. This type of information will be published in an AIRAC AIP Supplement.

3.1.4.2 AIRAC information will be issued so that the information will be received by the user not later than 28 days, and for major changes not later than 56 days, before the effective date. The table below indicates AIRAC effective dates for Years 2022 to 2026:

AIRAC Effective Dates				
Year 2022	Year 2023	Year 2024	Year 2025	Year 2026
27 January	26 January	25 January	23 January	22 January
24 February	23 February	22 February	20 February	19 February
24 March	23 March	21 March	20 March	19 March
21 April	20 April	18 April	17 April	16 April
19 May	18 May	16 May	15 May	14 May
16 June	15 June	13 June	12 June	11 June
14 July	13 July	11 July	10 July	09 July
11 August	10 August	08 August	07 August	06 August
08 September	07 September	05 September	04 September	03 September
06 October	05 October	03 October	02 October	01 October
03 November	02 November	31 October	30 October	29 October
01 December	30 November	28 November	27 November	26 November
29 December	28 December	26 December	25 December	24 December

3.1.4.3 A TRIGGER NOTAM will be originated giving a brief description of the contents of the AIRAC AIP Supplement, the effective date and time, and the reference number of the AIRAC AIP Supplement. This trigger NOTAM will come into force on the same effective date and time as the AIRAC AIP Supplement and will remain in force until 14 days after the effective date.

3.1.4.4 A NIL AIRAC NOTAM will be issued one cycle before the AIRAC effective date if no information is submitted for publication of an AIRAC AIP Supplement for an AIRAC effective date. The NIL AIRAC NOTAM will remain current for a duration of 14 days.

3.1.5 PRE-FLIGHT INFORMATION SERVICE AT AERODROMES

Aerodrome	Briefing Coverage	Availability of Bulletins
SINGAPORE CHANGI	All route stages emanating from Singapore.	Pre-flight Information Bulletin (PIB) can be retrieved from AIM-SG URL - https://aim-sg.caas.gov.sg
SELETAR		

3.1.6 DIGITAL DATA SETS

To be developed.

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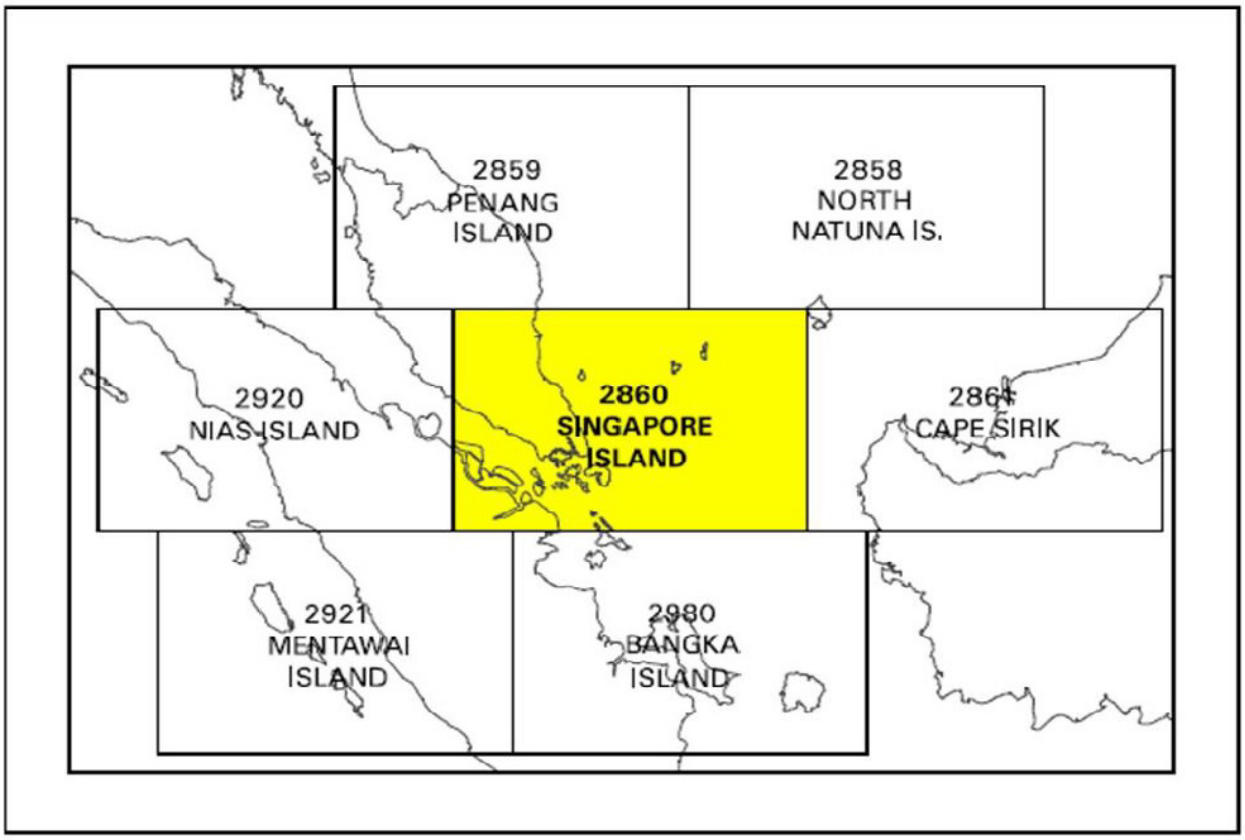
3.2.5 LIST OF AERONAUTICAL CHARTS AVAILABLE

Title of Chart Series	Scale	Name and/or number		Price ($)	Date
World Aeronautical Chart ICAO (WAC)	1:1 000 000		WAC 2860	In AIP	21 MAR 24
Enroute Chart ICAO (ENRC)			ERC 6-1	In AIP	27 NOV 25
Instrument Approach Chart ICAO (IAC)		**Singapore Changi**			
	1:400 000	RWY 02L - ICW ILS/DME	AD-2-WSSS-IAC-1	In AIP	20 FEB 25
	1:400 000	RWY 02C - ICE ILS/DME	AD-2-WSSS-IAC-2	In AIP	20 FEB 25
	1:400 000	RWY 02R - ICX ILS/DME	AD-2-WSSS-IAC-3	In AIP	20 FEB 25
	1:400 000	RWY 20R - ICH ILS/DME	AD-2-WSSS-IAC-5	In AIP	20 FEB 25
	1:400 000	RWY 20C - ICC ILS/DME	AD-2-WSSS-IAC-6	In AIP	20 FEB 25
	1:400 000	RWY 20C - VTK DVOR/DME	AD-2-WSSS-IAC-7	In AIP	20 FEB 25
	1:400 000	RWY 02L - RNP	AD-2-WSSS-IAC-9	In AIP	20 FEB 25
	1:400 000	RWY 02C - RNP	AD-2-WSSS-IAC-10	In AIP	20 FEB 25
	1:400 000	RWY 20R - RNP	AD-2-WSSS-IAC-11	In AIP	20 FEB 25
	1:400 000	RWY 20C - RNP	AD-2-WSSS-IAC-12	In AIP	20 FEB 25
	1:400 000	RWY 02R - RNP	AD-2-WSSS-IAC-13	In AIP	20 FEB 25
	1:400 000	RWY 20L - RNP	AD-2-WSSS-IAC-14	In AIP	31 OCT 24
		Paya Lebar			
	1:400 000	RWY 20 - PU DVOR/DME	In AIP	In AIP	20 FEB 25
	1:400 000	RWY 02 - PU DVOR/DME	In AIP	In AIP	20 FEB 25
	1:400 000	RWY 20 - IPS ILS/DME	In AIP	In AIP	20 FEB 25
	1:400 000	RWY 02 - IPN ILS/DME	In AIP	In AIP	20 FEB 25
	1:400 000	RWY 02 - RNP	In AIP	In AIP	20 FEB 25
	1:400 000	RWY 20 - RNP	In AIP	In AIP	20 FEB 25
Visual Approach Chart ICAO (VAC)	1:400 000	**Singapore Changi**	AD-2-WSSS-VAC-1	In AIP	20 FEB 25
		Seletar			
	1:100 000	RWY 03	AD-2-WSSL-VAC-1	In AIP	05 SEP 24
	1:100 000	RWY 21	AD-2-WSSL-VAC-2	In AIP	05 SEP 24
	1:100 000	RWY 03	AD-2-WSSL-VAC-3	In AIP	05 SEP 24
	1:100 000	RWY 21	AD-2-WSSL-VAC-4	In AIP	05 SEP 24
Visual Departure Chart		**Seletar**			
	1:100 000	RWY 03	AD-2-WSSL-VDC-1	In AIP	20 FEB 25
	1:100 000	RWY 21	AD-2-WSSL-VDC-2	In AIP	20 FEB 25
Aerodrome Chart ICAO (AC)		**Singapore Changi**	AD-2-WSSS-ADC-2	In AIP	27 NOV 25
		Seletar	AD-2-WSSL-ADC-1	In AIP	27 NOV 25
		Paya Lebar	AD-2-WSAP-ADC-1	In AIP	16 JUL 20
Aerodrome Obstacle Chart ICAO Type A (AOC)		**Singapore Changi**			
	1:10 000	RWY 20R/02L	AD-2-WSSS-AOC-1	In AIP	12 JUN 25
	1:10 000	RWY 20C/02C	AD-2-WSSS-AOC-2	In AIP	05 SEP 24
	1:10 000	RWY 02R/20L	AD-2-WSSS-AOC-4	In AIP	08 SEP 22
		Seletar			
	1:10 000	RWY 03/21	AD-2-WSSL-AOC-1	In AIP	16 JUL 20
		Paya Lebar			
	1:20 000	RWY 20/02	AD-2-WSAP-AOC-1	In AIP	24 MAR 22
Aerodrome Obstacle Chart ICAO Type B (AOC)		**Singapore Changi**			
	1:20 000	RWY 02L/20R, 02C/20C and RWY 02R/20L	AD-2-WSSS-AOC-3	In AIP	02 OCT 25
		Seletar			
	1:20 000	RWY 03/21	AD-2-WSSL-AOC-2	In AIP	16 JUL 20
Precision Approach Terrain Chart ICAO (PATC)		**Singapore Changi**			
	1:2 500	RWY 02L	AD-2-WSSS-PATC-1	In AIP	10 OCT 19
	1:2 500	RWY 20C	AD-2-WSSS-PATC-2	In AIP	11 JUL 24
	1:2 500	RWY 02R	AD-2-WSSS-PATC-3	In AIP	31 OCT 24
	1:2 500	RWY 20L	AD-2-WSSS-PATC-4	In AIP	31 OCT 24
	1:2 500	RWY 02C	AD-2-WSSS-PATC-5	In AIP	11 JUL 24

3.2.6 INDEX TO THE WORLD AERONAUTICAL CHART (WAC) - ICAO 1:1 000 000



3.2.7 TOPOGRAPHICAL CHARTS

NIL

3.2.8 CORRECTIONS TO CHARTS NOT CONTAINED IN THE AIP

Identification of charts	Location on the chart where the correction has to be made	Precise details of the corrections to be made
NIL	NIL	NIL

GEN 3.3 AIR TRAFFIC SERVICES

3.3.1 RESPONSIBLE SERVICE

3.3.1.1 The Director of the Air Traffic Services Division of the Civil Aviation Authority of Singapore (CAAS) acting under the authority of the Director-General of Civil Aviation is the authority responsible for the overall administration of air traffic services within the Singapore FIR.

Post: Director (Air Traffic Services)
Air Traffic Services Division
Civil Aviation Authority of Singapore
60 Airport Boulevard, #04-01, Changi Airport Terminal 2
Singapore 819643

Tel: (65) 65412669
Fax: (65) 6441 0221
AFS: WSJCZQZX

3.3.1.2 The services are provided in accordance with the provisions contained in the following ICAO documents:

Annex 2 – *Rules of the Air*

Annex 11 – *Air Traffic Services*

Doc 4444 – *Procedures for Air Navigation Services - Air Traffic Management (PANS-ATM)*

Doc 8168 – *Procedures for Air Navigation Services - Aircraft Operations (PANS-OPS)*

Doc 7030 – *Regional Supplementary Procedures*

3.3.1.3 Differences to these provisions are detailed in subsection GEN 1.7.

3.3.2 AREA OF RESPONSIBILITY

3.3.2.1 Air traffic services are provided for the entire territory of Singapore, including its territorial waters as well as the airspace over the high seas within the Singapore FIR.

3.3.2.2 In some cases, in accordance with the regional air navigation agreement, air traffic services are provided, under the delegated authority, in the airspace within another bordering FIR. Details of such services are provided in section ENR 2.

3.3.3 TYPES OF SERVICES

3.3.3.1 The following types of services are provided:

a. Air Traffic Control Service:
   i. Area Control
   ii. Approach Control
   iii. Aerodrome Control
b. Flight Information Service (FIS) and;
c. Alerting Service (ALRS)

3.3.3.2 With the exception of services provided at military air bases, the following types of services are provided at Changi and Seletar airports:

a. Aerodrome Control Service; and
b. Automatic Terminal Information Service (ATIS)

3.3.3.3 Air Traffic Control is exercised:

a. on airways covering the main ATS routes;
b. within the Singapore/Johor Airspace Complex and in control zones at controlled aerodromes equipped with approach and/or landing aids.

3.3.3.4 Flight information service and alerting service within the Singapore FIR and air traffic control services in control areas are provided by one centre (ACC Singapore). There is no distinction between upper and lower controlled airspace. The axis of each airway is constituted by a line connecting reference points identified normally by radio navigational facilities.

3.3.3.5 Air traffic control, flight information and alerting services are provided by:

a. ACC Singapore along the airways including those parts of the airways traversing the Singapore/Johor Airspace Complex;
b. the relevant aerodrome control tower in coordination with ACC Singapore as necessary, for arriving and departing aircraft.

3.3.3.6 Radar service is an integral part of the ATS system. A description of radar services and procedures is provided in subsection ENR 1.6. Additional procedures applicable within the Singapore/Johor Airspace Complex are contained in subsection ENR 1.1.

3.3.3.7 The description of the airspace designated for air traffic services purpose is found in several tables, all forming part of sub-section ENR 2.1.

3.3.3.8 In general, the air traffic rules and procedures in force and the organisation of air traffic services are in conformity with ICAO Standards, Recommended Practices and Procedures. The regional supplementary procedures and altimeter setting procedures are set out in full. Differences between the national and international rules and procedures are given in sub-section GEN 1.7.

3.3.3.9 A few prohibited areas, restricted areas and danger areas are established within the Singapore/Johor Airspace Complex. These areas are shown in sub-section ENR 5.1. Activation of areas subject to intermittent activity is notified well in advance by NOTAM, giving reference to the area only by its identification.

3.3.3.10 4D/15 service is provided to the following category of aircraft:

a. Aircraft operating within areas of Singapore FIR where radar services is provided by ATC;
b. ADS-B equipped aircraft operating in ADS-B airspace; and
c. ADS-C equipped aircraft logged on to WSJC on routes providing ADS/CPDLC service.

3.3.4 COORDINATION BETWEEN THE OPERATOR AND ATS

3.3.4.1 Coordination between the operator and air traffic services is effected in accordance with Chapter 2, paragraph 2.17 of ICAO Annex 11 - Air Traffic Services and Chapter 11, paragraphs 11.2.1.1.2,11.2.1.1.4 and 11.2.1.1.5 ICAO Doc 4444 - Procedures for Air Navigation Services - Air Traffic Management (PANS-ATM).

3.3.5 MINIMUM FLIGHT ALTITUDE

3.3.5.1 The minimum flight altitudes on the ATS routes listed in section ENR 3, have been determined to ensure at least 1,000ft (300m) vertical clearance above the highest known obstacle within the lateral limits of the route within Singapore FIR and the adjacent areas of adjoining FIRs.

3.3.6 ATS UNITS ADDRESS LIST

Unit Name	Postal Address	Telephone Nr	Telefax Nr	Telex Nr	AFS Address
1	2	3	4	5	6
SINGAPORE ACC / APP	Singapore Air Traffic Control Centre (SATCC) 60, Biggin Hill Road Singapore 509950	(65) 65412668 (ACC) (65) 65227002 (APP)	(65) 65457526 (ACC) (65) 65461790 (APP)	-	WSJCZQZX
SINGAPORE TOWER	Singapore Changi Control Tower Civil Aviation Authority of Singapore 60 Airport Boulevard, #04-01, Changi Airport Terminal 2 Singapore 819643	(65) 65956057 (65) 64227633	(65) 65459568 (65) 65456224	-	Nil
SELETAR TOWER	Seletar Control Tower Civil Aviation Authority of Singapore 60 Seletar Aerospace View Singapore 797561	(65) 64812893	(65) 64813510	-	WSSLZTZX

GEN 3.4 COMMUNICATION SERVICES

3.4.1 RESPONSIBLE SERVICE

3.4.1.1 The Civil Aviation Authority of Singapore (CAAS) is responsible for the provision of telecommunication and navigation facility services in Singapore.

3.4.1.2 Enquiries, suggestions or complaints regarding any telecommunication and navigation facility services should be referred to the Director-General of Civil Aviation.

Post: Director-General of Civil Aviation
Civil Aviation Authority of Singapore
60 Airport Boulevard, #04-01, Changi Airport Terminal 2
Singapore 819643
Tel: (65) 65421122
Fax: (65) 65421231
AFS: WSSSYAYX

3.4.1.3 The service is provided in accordance with the provisions contained in the following ICAO documents:

Annex 10	– *Aeronautical Telecommunications*
Doc 8400	– *Procedures for Air Navigation Services - ICAO Abbreviations and Codes (PANS-ABC)*
Doc 8585	– *Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services*
Doc 7030	– *Regional Supplementary Procedures*
Doc 7910	– *Location Indicators*
Doc 9880	– Manual on Detailed Technical Specifications for the Aeronautical Telecommunications Network (ATN) using ISO / OSI standards and protocols

3.4.1.4 Differences to these provisions are detailed in subsection GEN 1.7.

3.4.2 AREA OF RESPONSIBILITY

3.4.2.1
Communication services are provided for the entire SINGAPORE FIR.

3.4.2.2 For the following airspace within Jakarta FIR, aeronautical telecommunication services (CNS) will be jointly provided by Indonesia and Singapore:

The area bounded by 031727N 1052959E 012450N 1061648E 001030N 1045656E 000000N 1050340E 000000N 1044330E thence around the arc of a circle radius 90 NM centred on 011324N 1035124E to 013430N 1022353E 011300N 1033000E 011408N 1033142E 011200N 1033900E 011046N 1034015E 010800N 1034500E 011500N 1040000E 011800N 1043000E 012921N 1043441E 011947N 1044606E 021838N 1052205E 023641N 1051311E 024348N 1050854E 025010N 1051210E 031453N 1052619E 031727N 1052959E excluding the Tanjungpinang Terminal Control Area (TMA) and Control Zone (CTR).

Vertical limit: SFC to FL370

3.4.3 TYPES OF SERVICE

3.4.3.1 Radio navigation services.

3.4.3.1.1 The following types of radio aids to navigation are available:

LF/MF non-directional beacon (NDB)

Instrument landing system (ILS)

Instrument landing system (ILS)

Doppler VHF omni-directional radio range (DVOR)

Distance measuring equipment (DME)

Long range primary and secondary surveillance radar

Primary and secondary approach radar

Airport surface detection equipment (ASDE)

3.4.3.2 Voice/data link services

3.4.3.2.1 Voice Service

a) The aeronautical stations maintain a continuous watch on their stated frequencies during the published hours of service unless otherwise notified.

b) An aircraft should normally communicate with the air-ground control radio station that exercises control in the area in which the aircraft is flying. Aircraft should maintain a continuous watch on the appropriate frequency of the control station and should not abandon watch, except in an emergency, without informing the control radio station.

3.4.3.2.2 Enroute Communications Organisation

a) The radio frequencies for enroute communications are listen in subsection ENR 2.1
b) The Singapore HF network provides an umbrella communication coverage for the FIR and may be contacted if communication cannot be maintained on the primary channel.
c) Aircraft approaching or departing from an airport is required to communicate with that airport on the appropriate surface movement, tower, or approach control frequency.
d) ADS-C and / or CPDLC services are available to suitably equipped aircraft operating outside radar cover and not in ADS-B exclusive airspace within the Singapore FIR. The hours when ADS-C and CPLDC services are available and the logon requirements are listed in ENR 2.1. Full details of the services are published in ENR 1.1 paragraphs 9.1 to 9.6.

3.4.3.2.3 Data Link Service

a) The messages to be transmitted over the Aeronautical Fixed Service (AFS) are accepted only if:
   i) the messages satisfy the requirements of ICAO Annex 10, Volume II, Chapter 3, paragraph 3.3;
   ii) the messages are prepared in the form specified in ICAO Annex 10;
   iii) the text of an individual message does not exceed 1800 characters.

3.4.3.2.4 General Aircraft Operating Agency Messages

a) General aircraft operating agency messages (with priority indicator “KK”) are only accepted for transmission to countries which have agreed to accept Class B2 traffic. Details of telecommunication charges for Class B2 traffic to countries with which Singapore has agreement for handling of such traffic are given below:
   i) List of States/Regions to which Class B2 traffic will be accepted (rate of charge will be S$0.30 per word):
   Australia, Brunei, Hong Kong, Indonesia (AFS Stations), Kampuchea Democratic, Malaysia (Peninsular Malaysia, Sabah and Sarawak), Myanmar, Netherlands, New Zealand, Philippines (Manila), Singapore, Taiwan, Thailand and Vietnam.

3.4.3.3 Broadcasting service

3.4.3.3.1 The following broadcasts are available for the use of aircraft in flight:

a) HF RTF Volmet Broadcasts (page GEN 3.5-7 refers)
b) VHF ATIS Broadcasts (page GEN 3.4-3 refers)

COMPUTERISED ATIS BROADCASTS			
Station	*Callsign Identification*	*Frequency MHz*	*Hours UTC*
1	2	3	4
SINGAPORE / Singapore Changi	Changi Airport Departure Information	128.6	H24 (broadcasting with half hourly updated MET INFO)
	Changi Airport Arrival Information	128.025	
SINGAPORE/ Seletar	Seletar Airport Information	128.425	H24 (broadcasting with hourly updated MET INFO)
Remarks			
Alphabetical Reference All ATIS broadcasts will include Alphabetical Reference for identification in the ATIS message. Updating of Data H + 00 to H + 10 and H + 30 to H + 40. Range 100NM Height A110 Power 50W Note to D-ATIS users Pilots are advised to use AEEC 623 format with Cyclic Redundancy Check (CRC) for D-ATIS service to ensure data integrity. For aircraft formats without CRC (e.g. AEEC 620 format or AEEC 623 format without CRC), pilots are advised to verify the D-ATIS message received with the voice broadcasted ATIS message or to use only voice broadcasted ATIS service.			

3.4.3.4 Language Used

3.4.3.4.1 The language used is English.

3.4.3.5 Obtaining Detailed Information

3.4.3.5.1 Details of the various facilities available for the en-route traffic can be found in section ENR 4.

3.4.4 REQUIREMENTS AND CONDITIONS

3.4.4.1 The requirements of the Civil Aviation Authority of Singapore and the general conditions under which the communication services are available for international use, as well as the requirements for the carriage of radio equipment, are contained in the Air Navigation Order of Singapore.

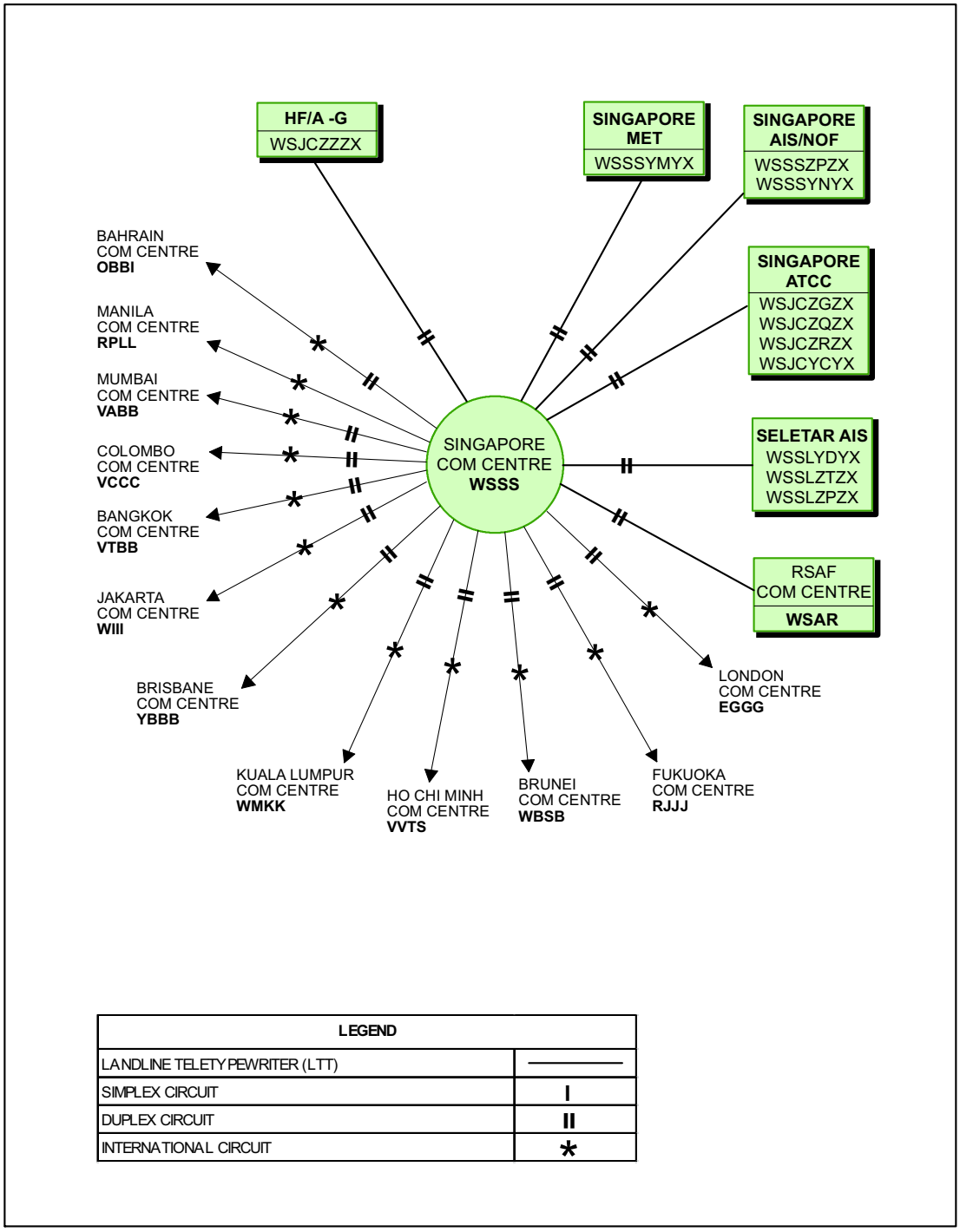
3.4.5 MISCELLANEOUS

NIL

AERONAUTICAL FIXED SERVICES - INTERNATIONAL AND DOMESTIC CIRCUITS										
STATION			CORRESPONDENT		TYPE OF CHANNEL	RADIO FREQUENCIES		TYPE OF TRAFFIC	HOURS (UTC)	REMARKS
NAME	LOCATION INDICATOR	CALLSIGN FOR RADIO CIRCUITS	NAME	CALLSIGN FOR RADIO CIRCUITS		TRANS KHZ	REC KHZ			
1	2	3	4	5	6	7	8	9	10	11
SINGAPORE	WSSS		BANGKOK		LTTdx			AFS	H24	
	WSSS		BAHRAIN		LTTdx			AFS	H24	
	WSSS		BRUNEI		LTTdx			AFS	H24	
	WSSS		COLOMBO		LTTdx			AFS	H24	
	WSSS		HO CHI MINH		LTTdx			AFS	H24	
	WSSS		JAKARTA		LTTdx			AFS	H24	
	WSSS		KUALA LUMPUR		LTTdx			AFS	H24	
	WSSS		LONDON		LTTdx			AFS	H24	
	WSSS		MANILA		LTTdx			AFS	H24	
	WSSS		BRISBANE		LTTdx			AFS	H24	
	WSSS		FUKUOKA		LTTdx			AFS	H24	
	WSSS		MUMBAI		LTTdx			AFS	H24	

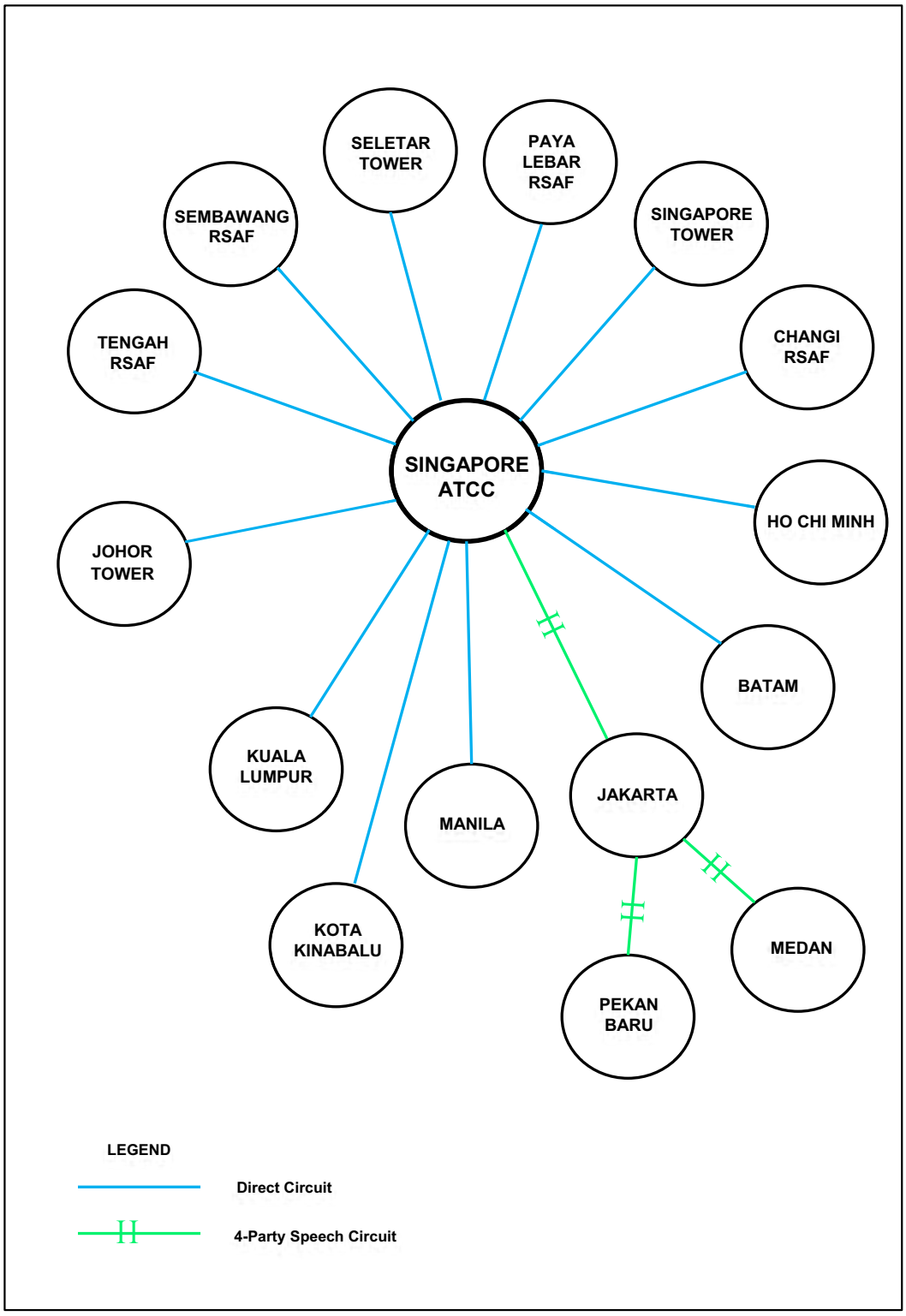
AERONAUTICAL FIXED SERVICES - INTERNATIONAL AND DOMESTIC CIRCUITS										
STATION			CORRESPONDENT		TYPE OF CHANNEL	RADIO FREQUENCIES		TYPE OF TRAFFIC	HOURS (UTC)	REMARKS
NAME	LOCATION INDICATOR	CALLSIGN FOR RADIO CIRCUITS	NAME	CALLSIGN FOR RADIO CIRCUITS		TRANS KHZ	REC KHZ			
1	2	3	4	5	6	7	8	9	10	11
SINGAPORE ACC			JOHOR BAHRU KUALA LUMPUR		LTTdx			ATS	H24	Direct ATS Speech Circuit
			KUCHING		LTTdx			ATS	During aerodrome hours of operation	Direct ATS Speech Circuit
			KOTA KINABALU		LTTdx			ATS	H24	Direct ATS Speech Circuit
			JAKARTA		LTTdx			ATS	H24	4-party Speech Circuit
			PEKAN BARU		LTTdx			ATS	0001-1100	4-party Speech Circuit
			MANILA		LTTdx			ATS	H24	Direct ATS Speech Circuit
			MEDAN		LTTdx			ATS	2300-1400	4-party Speech Circuit
		BATAM		LTTdx			ATS	0100-0800	Direct ATS Speech Circuit	
Note: For local circuits connecting different offices to a Com Centre, see diagrams GEN 3.4-7 and 3.4-9										

AERONAUTICAL FIXED SERVICES -
AERONAUTICAL FIXED TELECOMMUNICATIONS NETWORK (AFTN)
AIR TRAFFIC SERVICES (ATS) MESSAGE HANDLING SERVICES (AMHS)



LEGEND	
LANDLINE TELETYPEWRITER (LTT)	————
SIMPLEX CIRCUIT	I
DUPLEX CIRCUIT	II
INTERNATIONAL CIRCUIT	*

AERONAUTICAL FIXED SERVICES - TELEPHONE



GEN 3.5 METEOROLOGICAL SERVICES

3.5.1 RESPONSIBLE SERVICE

3.5.1.1 The meteorological services for international air navigation are provided by the Meteorological Service Singapore of the National Environment Agency.

Post: THE DIRECTOR-GENERAL
Meteorological Service Singapore
Singapore Changi Airport,
P.O. Box 8
SINGAPORE819643
Tel: (65) 65457190 (HQ)
(65) 62446133 / (65) 65422837 (MET Office)
Fax: (65) 65457192 (HQ)
(65) 65425026 (MET Office)
AFS: WSSSYMYX
URL: www.weather.gov.sg

3.5.1.2 The service is provided in accordance with the provisions contained in the following ICAO documents:

Annex 3 – *Meteorological Service for International Air Navigation*
Doc 10157 – *Procedures for Air Navigation Services - Meteorology (PANS-MET)*
Doc 7030 – *Regional Supplementary Procedures Part 3 - Meteorology*

3.5.1.3 Differences to these provisions, if any, are detailed in subsection GEN 1.7.

3.5.2 AREA OF RESPONSIBILITY

3.5.2.1 Aeronautical meteorological services (MET) is provided for the Singapore FIR. For the following portions of Jakarta FIR, MET is jointly provided by Indonesia and Singapore:

The area bounded by 031727N 1052959E 012450N 1061648E 001030N 1045656E 000000N 1050340E 000000N 1044330E thence around the arc of a circle radius 90 NM centred on 011324N 1035124E to 013430N 1022353E 011300N 1033000E 011408N 1033142E 011200N 1033900E 011046N 1034015E 010800N 1034500E 011500N 1040000E 011800N 1043000E 012921N 1043441E 011947N 1044606E 021838N 1052205E 023641N 1051311E 024348N 1050854E 025010N 1051210E 031453N 1052619E 031727N 1052959E

Vertical limit: SFC to FL370

3.5.3 METEOROLOGICAL OBSERVATIONS AND REPORTS

Meteorological Observations and Reports					
Name of Station/ Location Indicator	*Type & Frequency of Observation/ Automatic Observing Equipment*	*Types of MET Reports & Supplementa-ry Information included*	*Observation System & Sites (s)*	*Hours of Operation*	*Climatological Information*
1	2	3	4	5	6
SINGAPORE/ Singapore Changi WSSS	Half hourly plus special observations	MET REPORT Special Report METAR SPECI TREND WS	a) Ultrasonic wind sensors at ends and middle of RWY 02L/20R (Runway 1), RWY 02C/20C (Runway 2) and RWY 02R/20L (Runway 3). Surface wind report in METAR and SPECI is taken from the wind sensor at the southern end of RWY 02L (with the sensor at the northern end of RWY 02C/20C as backup). b) Windsocks at ends of all runways. c) Transmissometers at both ends and in the middle of all runways. d) Low level wind shear observations made continuously by system of 15 surface wind sensors, located in the airport and its vicinity. e) Integrated and combination of MET Doppler X, C and S band weather radars and two wind lidars for detecting wind shear up to 20km and monitoring storms up to 480km.	H24	Climatological Summaries available at Meteorological Service Singapore of the National Environment Agency.
SINGAPORE/ Seletar WSSL	Hourly plus special observations	MET REPORT Special Report METAR SPECI WS	a) Ultrasonic wind sensors at the ends of runway (surface wind report in METAR and SPECI is taken from measurements of the ultrasonic wind sensor at RWY 03). b) Windsocks at both ends of RWY 03 and 21. c) Transmissometers at both ends of RWY 03 and 21. d) Low level wind shear observations made continuously by system of 6 surface wind sensors, located in its vicinity. e) Integrated and combination of MET Doppler C and S band weather radars for detecting wind shear within 20km and monitoring storms up to 480km.	H24	NIL
SINGAPORE/ Paya Lebar WSAP	Hourly plus special observations	METAR SPECI	a) Cup anemometers and wind vanes located at both ends of the runway, and an ultrasonic wind sensor located at 400m next to mid-runway. Surface wind report in METAR and SPECI is taken from the ultrasonic wind sensor.	H24	NIL

3.5.4 TYPES OF SERVICES

3.5.4.1 The Meteorological Office and Meteorological Watch Office at Singapore Changi Airport operate H24 and provide the following services for international air navigation:

a) Full meteorological documentation and briefing for current operational planning for all flights operating out of Singapore Changi Airport via the Aviation Weather Services Portal at URL https://www.weather.gov.sg/aviation;
b) Area meteorological watch over the Singapore FIR with the supply of meteorological information including SIGMET information to aircraft in flight through the Singapore ATS radio channels (see subsection AD 2.11);
c) For the portions of airspace within the Jakarta FIR where MET is jointly provided by Indonesia and Singapore (see GEN 3.5 para 3.5.2.1), high level SIGWX forecasts are provided jointly with the Centre for Aviation Meteorology of BMKG; SIGMET and special air reports (ARS) are provided jointly with Meteorological Watch Office Jakarta;
d) HF RTF VOLMET broadcasts of meteorological information (see page GEN 3.5-7), Aviation weather report with trend statement, strong low level vertical wind shear report and aerodrome warnings are also included in VHF ATIS broadcasts for Singapore Changi Airport (see page GEN 3.4-3);
e) Meteorological information for ATS.

3.5.4.2 Weather briefing by a forecaster is available H24 to qualified flight operations personnel at the Meteorological Office at Singapore Changi Airport or via telephone at (65)62446133 / (65)65422837. Weather information is available online via the Aviation Weather Services Portal at URL https://www.weather.gov.sg/aviation (see paragraph 9.2 for further details).

3.5.4.3 The Meteorological Office at Seletar Aerodrome operates H24 and provides meteorological documentation without briefing for international and general aviation flights operating out of Seletar Aerodrome.

3.5.4.4 Details of documentation supplied for each flight are determined by arrangement between the operator and the Meteorological Office. In general, the pilot-in-command is provided with documentation comprising one or more fixed-time prognostic streamline/istotach/spot temperature charts of standard isobaric surfaces appropriate to the cruising level (ICAO model IS), one of fixed-time prognostic significant weather chart code form and appropriate aerodrome forecasts in TAF code form.

3.5.4.5 Routine aerodrome forecasts received from other Meteorological Offices are normally included in meteorological documentation without modification. When a required aerodrome forecast is not received, a provisional forecast may be issued by the Meteorological Office providing the documentation.

3.5.4.6 After documentation has been issued and until take-off (i.e. the latest ETD notified to the Meteorological Office), the Meteorological Office at Singapore Changi Airport makes available amendments to the documentation. It is the responsibility of the operator's local representative or the pilot-in-command to obtain any pre-departure amendment(s) from the Meteorological Office at Singapore Changi Airport. The pilot-in-command may request pre-departure amendment(s) through the Singapore Changi Airport Control Tower.

3.5.4.7 Climatological Summaries for Singapore Changi (WSSS-48698) are available from the Meteorological Service Singapore.

3.5.5 OBSERVING SYSTEMS AND OPERATING PROCEDURES AT SINGAPORE CHANGI AIRPORT AND SELETAR AERODROME

3.5.5.1 SINGAPORE CHANGI AIRPORT

3.5.5.2 RWY 02L/20R (Runway 1)

3.5.5.2.1 Surface wind is measured by three ultrasonic wind sensors located as follows:

	DIST FROM END OF RWY	DIST FROM RWY CENTRELINE
(i) One set at	406 metres north of RWY 02L	120 metres
(ii) One set at	Middle of runway	121 metres
(iii) One set at	381 metres south of RWY 20R	121 metres

3.5.5.2.2 RVR observations are made by means of three sets of transmissometers, located as follows:

	DIST FROM END OF RWY	DIST FROM RWY CENTRELINE
(i) 1st set	446 metres north of RWY 02L	120 metres
(ii) 2nd set	Middle of runway	121 metres
(iii) 3rd set	421 metres south of RWY 20R	121 metres

3.5.5.2.3 RVR is reported in steps of 25 metres between 0 and 400 metres, 50 metres between 400 and 800 metres and 100 metres between 800 and 1,500 metres.

3.5.5.2.4 Surface wind report in METAR and SPECI is taken from the wind sensor at the southern end of RWY 02L (with the sensor at the northern end of RWY 02C/20C as backup).

3.5.5.3 RWY 02C/20C (Runway 2)

3.5.5.3.1 Surface wind is measured by three ultrasonic wind sensors, located as follows:

	DIST FROM THRESHOLD	DIST FROM RWY CENTRELINE
(i) One set at	414 metres north of RWY 02C	130 metres
(ii) One set at	Middle of runway	130 metres
(iii) One set at	413 metres south of RWY 20C	128 metres

3.5.5.3.2 RVR observations are made by means of three sets of transmissometers, located as follows:

	DIST FROM THRESHOLD	DIST FROM RWY CENTRELINE
(i) 1st set	449 metres north of RWY 02C	120 metres
(ii) 2nd set	Middle of runway	120 metres
(iii) 3rd set	427 metres south of RWY 20C	120 metres

3.5.5.3.3 RVR is reported in steps of 25 metres between 0 and 400 metres, 50 metres between 400 and 800 metres and 100 metres between 800 and 1,500 metres.

3.5.5.4 RWY 02R/20L (Runway 3)

3.5.5.4.1 Surface wind is measured by three ultrasonic wind sensors located as follows:

	DIST FROM THRESHOLD	DIST FROM RWY CENTRELINE
(i) One set at	428 metres north of RWY 02R	132 metres
(ii) One set at	Middle of runway	121 metres
(iii) One set at	435 metres south of RWY 20L	132 metres

3.5.5.4.2 RVR observations are made by means of three sets of transmissometers, located as follows:

	DIST FROM THRESHOLD	DIST FROM RWY CENTRELINE
1st set	421 metres north of RWY 02R	120 metres
2nd set	Middle of runway	121 metres
3rd set	425 metres south of RWY 20L	120 metres

3.5.5.4.3 RVR is reported in steps of 25 metres between 0 and 400 metres, 50 metres between 400 and 800 metres and 100 metres between 800 and 1500 metres.

3.5.5.5 Wind Shear Observations (Singapore Changi Airport)

3.5.5.5.1 Horizontal low level wind shear observations are measured continuously by a system consisting of 15 surface wind sensors, MET Doppler X, S and C band weather radars and two wind lidars located in Singapore Changi airport and its vicinity.

3.5.5.5.2 ATC will pass to all aircraft taking off or landing for the next 1/2 hour from the time of report whenever microburst or wind shear of intensity 15 knots or greater is observed/reported.

3.5.5.5.3 The phraseology used by ATC to warn pilots of the presence of wind shear of intensity between 15 and 30 knots is:

> "..... (callsign) WIND SHEAR WARNING
> STRONG LOW LEVEL WIND SHEAR OBSERVED IN THE
> VICINITY OF
> CHANGI AIRPORT AT ..... (time)"

3.5.5.5.4 The phraseology used by ATC to warn pilots of the presence of wind shear of intensity greater than 30 knots is:

> ".....(callsign) WIND SHEAR WARNING
> SEVERE LOW LEVEL WIND SHEAR OBSERVED IN THE
> VICINITY OF
> CHANGI AIRPORT AT .....(time)"

3.5.5.5.5 The presence of wind shear will also be broadcast in the ATIS for the next half an hour.

3.5.6 SELETAR AERODROME

3.5.6.1 Surface wind is measured by ultrasonic wind sensors at ends of runway. Surface wind report in METAR and SPECI is taken from measurements of the ultrasonic wind sensor at RWY 03.

3.5.6.2 Wind Shear Observations (Seletar Aerodrome)

3.5.6.2.1 ATC will pass to all aircraft taking off or landing for the next 1/2 hour from the time of report whenever microburst or windshear of intensity 15 knots or greater is observed/reported.

3.5.6.2.2 The phraseology used by ATC to warn pilots of the presence of wind shear of intensity between 15 and 30 knots is:

"..........(callsign) WIND SHEAR WARNING
STRONG LOW LEVEL WIND SHEAR
OBSERVED IN THE VICINITY OF
SELETAR AIRPORT AT .....(time)"

3.5.6.2.3 The phraseology used by ATC to warn pilots of the presence of wind shear of intensity greater than 30 knots is:

"..........(callsign) WIND SHEAR WARNING
SEVERE LOW LEVEL WIND SHEAR
OBSERVED IN THE VICINITY OF
SELETAR AIRPORT AT .....(time)"

3.5.7 NOTIFICATION REQUIRED FROM OPERATORS

3.5.7.1 It is the responsibility of the operator or the pilot-in-command to notify the meteorological office of any flight for which meteorological documentation is required (ref. ICAO Annex 3, paragraph 2.3). As much prior notice as possible should be given, and at least one hour notice at Singapore Changi Airport and two hours at Seletar Aerodrome would be required for nonscheduled flights.

3.5.8 AIRCRAFT REPORTS

3.5.8.1 AIREP

3.5.8.1.1 Special aircraft observations shall be made and the reports transmitted as necessary to ATC.

3.5.8.1.2 Special aircraft observations of pre-eruption volcanic activity, volcanic eruption or volcanic ash cloud shall be recorded on the special Air-Report of Volcanic Activity form which can be downloaded from URL https://aim-sg.caas.gov.sg. A copy of the completed Volcanic Activity Report shall be delivered by the operator or a flight crew member, without delay, either personally or by telephone facsimile (TEL: 62446133 / 65422837 or FAX: 65429978 / 65425026) to the Meteorological Office, Singapore Changi Airport.

3.5.8.2 REPORTING OF LOW LEVEL WIND SHEAR

3.5.8.2.1 Pilots encountering wind shear shall report to ATC as soon as possible.

3.5.8.2.2 When reporting wind shear on radiotelephony, the information should be transmitted in this order:

a) Aircraft callsign;
b) WIND SHEAR report;
c) Time (of wind shear occurrence);
d) Position (of wind shear);
e) Intensity (moderate, strong or severe);
f) Average height of wind shear layer.

3.5.8.2.3 On receipt of a wind shear report from a pilot, ATC will pass it to other aircraft in the vicinity. The following phraseology will be used:

"WIND SHEAR WARNING
ARRIVING (or DEPARTING) ..... (type of aircraft)
REPORTED ..... (moderate, strong, severe)
WIND SHEAR IN APPROACH (or DEPARTURE)
RUNWAY ..... (number) AT ..... (time)
HEIGHT OF WIND SHEAR LAYER ..... (feet)"

3.5.8.2.4 The presence of wind shear as reported by a pilot will also be broadcast in the ATIS for the next half an hour unless subsequent reports indicate that wind shear no longer exists.

3.5.9 VOLMET SERVICE

VOLMET SERVICE						
Name of station	*CALLSIGN IDENT (EM)*	*Frequency*	*Broadcast period*	*HR of SER*	*Aerodromes included*	*Contents and format of REP and FCST*
1	2	3	4	5	6	7
SINGAPORE	SINGAPORE RADIO (A3J)	6676KHz (1230-2230) 11387KHz (2230-1230)	H + 20 to H + 25 and	H24	SINGAPORE (1) SINGAPORE (2)(4) KUALA LUMPUR (3)(4) SUBANG AIRPORT (4) SOEKARNO-HATTA (3)(4) KUCHING (3)(4) BRUNEI (3)(4) KOTA KINABALU (3)(4) DEN PASAR (3) (4) PENANG (3)(4) SINGAPORE (5) KUALA LUMPUR (4)(8)	SIGMET METAR METAR METAR METAR METAR METAR METAR METAR METAR TAF TAF
			H + 50 to H + 55		SINGAPORE (1) SINGAPORE (4)(6) KUALA LUMPUR (4)(7) SUBANG AIRPORT (4) SOEKARNO-HATTA (4)(7) KUCHING (4)(7) BRUNEI (4)(7) KOTA KINABALU (4)(7) DEN PASAR (4)(7) PENANG (4)(7) SINGAPORE (5) SOEKARNO HATTA (4)(8)	SIGMET METAR METAR METAR METAR METAR METAR METAR METAR METAR TAF TAF
	Plain Language EN. (1) SIGMET message or 'NIL' is transmitted. (2) Latest routine report H+00 including trend statement; repeated at end of broadcast, time permitting. (3) H+00 (or the previous H+30 report when the H+00 report is not available) including trend statement when appended. (4) As available. (5) Valid for 12 hours. (6) Latest routine report H+30 including trend statement; repeated at end of broadcast, time permitting. (7) H+30 (or the H+00 report when the H+30 report is not available) including trend statement when appended. (8) Valid for 30 hours.					
SINGAPORE	SINGAPORE VOLMET	D-VOLMET	as required	H24	SINGAPORE KUALA LUMPUR SOEKARNO-HATTA SINGAPORE KUALA LUMPUR SUBANG AIRPORT SOEKARNO-HATTA KUCHING BRUNEI KOTA KINABALU DEN PASAR PENANG SINGAPORE KUALA IUMPUR SOEKARNO-HATTA	SIGMET SIGMET SIGMET METAR METAR METAR METAR METAR METAR METAR METAR METAR TAF TAF TAF
	Data Link VOLMET (D-VOLMET) service available H24. AP Ident WSSS. Messages comply with ARINC 623 standards.					

3.5.10 SIGMET SERVICE

3.5.10.1 General

3.5.10.1.1 For the safety of air traffic, the Meteorological Watch Office of Singapore maintains an area meteorological watch and warning service. This service consists partly of a continuous weather watch within the Singapore FIR and the portions of airspace within the Jakarta FIR where MET is jointly provided by Indonesia and Singapore (see GEN 3.5 para 3.5.2.1), and issuance of appropriate information (SIGMET) by Meteorological Watch Office of Singapore and partly of the issuing of warnings for Changi Airport.

SIGMET SERVICE						
Name of MWO/ location indicators	*Hours of Operation*	*FIR or CTA served*	*Type of SIGMET / validity*	*Specific procedures*	*ATS unit served*	*Additional Information*
1	2	3	4	5	6	7
SINGAPORE /WSSS	H24	Singapore FIR Jakarta FIR*	SIGMET / 4-6HR	Nil	Singapore ACC	Nil

* For the portions of airspace within the Jakarta FIR where MET is jointly provided by Indonesia and Singapore (see GEN 3.5 para 3.5.2.1), SIGMET is jointly provided by the Meteorological Watch Offices of Jakarta and Singapore. The Meteorological Watch Offices of Jakarta and Singapore have implemented agreed coordination procedures in accordance with the procedures in the ICAO Asia/Pacific Regional SIGMET Guide and Operational SIGMET Coordination to ensure that there is no conflict in the SIGMETs published by both Meteorological Watch Offices.

3.5.11 Area Meteorological Watch Service

3.5.11.1 The area meteorological watch service is performed by the Meteorological Service Singapore.

3.5.11.2 The Meteorological Service Singapore issues information in the form of SIGMET messages about the occurrence or expected occurrence of one or several of the following significant meteorological phenomena:

- thunderstorms *
- severe turbulence
- severe icing
- severe mountain waves
- heavy sand storm/dust storm
- volcanic ash cloud
- tropical cyclone

* Area of widespread cumulonimbus clouds or cumulonimbus along a line (squall line) with little or no space between individual clouds, or cumulonimbus embedded in cloud layers or obscured by haze.

3.5.11.3 The SIGMETs are issued in abbreviated plain language using ICAO abbreviations and are respectively numbered consecutively for each day commencing at 0001. Their period of validity is generally not more than 4 hours and less than 6 hours from the time of transmission.

3.5.11.4 SIGMETs issued by the Meteorological Service Singapore are transmitted to adjacent MWOs in accordance with regional air navigation agreements and used by ATS units in Singapore.

3.5.12 Warning Service

3.5.12.1 Aerodrome warnings for Changi Airport are issued by Meteorological Service Singapore if one or several of the following phenomena are expected to occur at the airport:

- squall
- thunderstorm
- hail
- tornado
- horizontal visibility and/or RVR of 800 metres or less
- mean surface wind speed of 25 knots or more
- wind gusts of 35 knots or more
- cloud of BKN or OVC amount with base 500 ft or less

3.5.12.2 The warnings are:

- for the protection of parked and moored aircraft,
- for the protection of equipment at the airport, and
- for the safety of arriving and departing aircraft.

3.5.12.3 The warnings are issued in English and are distributed in accordance with a distribution list which has to be agreed upon locally. In order to guarantee rapid dissemination of the warnings, the distribution list to be used shall, as far as possible, contain only one recipient for an interested group; this recipient will be responsible for the further dissemination of the warning within the group.

3.5.12.4 SIGMET is disseminated by directed transmissions to aircraft through general calls by the Singapore Area Control Centre for Singapore FIR , and the portions of airspace within the Jakarta FIR where MET is jointly provided by Indonesia and Singapore (see GEN 3.5 para 3.5.2.1).

3.5.13 OTHER AUTOMATED METEOROLOGICAL SERVICES

3.5.13.1 Besides VOLMET and ATIS broadcasts, airline operators can obtain access to various operational meteorological information through the Aviation Weather Services Portal and automated faxing service.

3.5.13.2 The Aviation Weather Services Portal is free to airlines and flight operators for flights departing from Singapore Changi or Seletar Airports. It is accessible via the "Login" link at URL https://www.weather.gov.sg/. A registered user account is required for the access. For registration, please email to MSS_Aviation_Enquiries@nea.gov.sg.

AVIATION WEATHER SERVICES PORTAL

Service Name	*Information Available*	*Area, Route and Aerodrome Coverage*	*Telephone and Telefax numbers Remarks*
1	2	3	4
Aviation Weather Services Portal	METAR, SPECI, TAF, AD Warning, Wind Shear Warning, SIGMET, Tropical Cyclone Warnings/Advisories, Volcanic Ash, Radioactive Fallout and Haze Information Advisories	All METAR, SPECI, TAF, SIGMET, Tropical Cyclone Warnings/Advisories, Volcanic Ash, Radioactive Fallout Advisories received from designated major centres around the world. AD Warning and Wind Shear Warning for WSSS and WSSL. Haze Information/Advisories for Southeast Asia Region	
	Latest Himawari-8 composite and true colour satellite images every 20 minutes	Southeast Asia and full globe	
	Latest Himawari-8 IR and hourly cloud top height satellite images every 10-minutes	Asia Pacific	
	Latest images from other satellites such as EUMETSAT, NOAA and Feng-Yun weather satellites	Europe, US Polar, America and Asia Pacific	
	Low-to-Mid-Level Significant Weather Charts	Low-Medium level (Surface-FL250) covering southern ASEAN region	
	WAFS(World Area Forecast System) SIGWX charts	Medium-High level covering Asia, Middle East, Africa, America and Europe	
	Prognostic Wind-Temperature charts	Standard levels covering Europe, America, Asia-Pacific regions and the southern ASEAN region.	
	Weather Radar images	Latest Singapore Changi Airport 70km, 240km and480km range rain intensity radar plots.	
	WAFC Washington model gridded data	Full globe forecast of winds, temperature, turbulence potential, icing potential and horizontal extent of cumulonimbus clouds	
	Take-off conditions	Singapore Changi Airport	
	Climb and Descent winds forecast	Selected airports over Asia Pacific, Europe, Africa and North America	

Note: Details of meteorological briefing at aerodromes are given in the individual aerodrome sections, i.e. AD 2

GEN 3.6 SEARCH AND RESCUE

1 RESPONSIBLE SERVICE(S)

1.1 The search and rescue service in Singapore is provided by the Civil Aviation Authority of Singapore, in collaboration with the Ministry of Defence, Meteorological Service and Maritime and Port Authority of Singapore, which have the responsibility for making the necessary facilities available. The postal and telegraphic addresses of the Civil Aviation Authority of Singapore are given on page GEN 1.1-1.

Post: RESCUE COORDINATION CENTRE (RCC),
60 Biggin Hill Road,
Singapore 509950.
Tel: (65) 65425024 - Singapore RCC
(65) 65412668 or (65) 65412672 - Singapore ACC
Fax: (65) 65422548
AFS: WSJCZQZX

1.2 The service is provided in accordance with the provisions contained in the following ICAO documents and local procedures:

Annex 12 – Search and Rescue
Annex 13 – Aircraft Accident and Incident Investigation
Doc 7030 – Regional Supplementary Procedures for Alerting and SAR services applicable in the SEA Region.
Doc 9731 – International Aeronautical and Maritime Search and Rescue Manuals Volume 1, 2 and 3 Singapore local procedures

2 AREA OF RESPONSIBILITY

2.1 The search and rescue service in Singapore is responsible for SAR operations within Singapore SRR.

2.2 For the following airspace within Jakarta FIR, search and rescue services (SAR) will be jointly provided by Indonesia and Singapore:

The area bounded by 031727N 1052959E 012450N 1061648E 001030N 1045656E 000000N 1050340E 000000N 1044330E thence around the arc of a circle radius 90 NM centred on 011324N 1035124E to 013430N 1022353E 011300N 1033000E 011408N 1033142E 011200N 1033900E 011046N 1034015E 010800N 1034500E 011500N 1040000E 011800N 1043000E 012921N 1043441E 011947N 1044606E 021838N 1052205E 023641N 1051311E 024348N 1050854E 025010N 1051210E 031453N 1052619E 031727N 1052959E excluding the Tanjungpinang Terminal Control Area (TMA) and Control Zone (CTR).

Vertical limit: SFC to FL370

3 TYPES OF SERVICES

3.1 Details of the rescue coordination centre and related supporting rescue units are given in the table on page GEN 3.6-3 titled - Search and Rescue Units. In addition, various elements of the Singapore Police Force, Maritime and Port Authority of Singapore and the Merchant Marine are available for search and rescue missions, when required. The aeronautical, maritime and public telecommunication services are available to the search and rescue organisation.

3.2 All search aircraft are land planes and carry survival equipment, capable of being dropped, consisting of inflatable rubber dinghies equipped with general purpose first aid supplies, emergency rations and survival radio equipment. Aircraft are equipped to communicate on 121.5MHz, 123.1MHz, 243.0MHz, 282.8MHz, 2182KHz, 3023KHz and 5680KHz and are also equipped with VHF/UHF direction finder. Marine craft are equipped to communicate on 123.1MHz, 282.8MHz, 2182KHz, 3023KHz and 5680KHz and are equipped with radar.

3.3 The Singapore RCC provides distress alert detection of Emergency Locator Transmitters (ELTs), Emergency Position Indicator Radio Beacons (EPIRBs) and Personal Locator Beacons (PLBs) using the Cospas-Sarsat Satellite Aided Tracking System. This system is able to detect 406.0MHz beacons globally and the information is shared with the other users of the system. A database of the Singapore registered aviation beacons is kept at the RCC and the Maritime beacons are in the Maritime and Port Authority database.

3.4 Users of 406.0MHz beacons that are coupled with the 121.5MHz frequency will be able to use the 121.5MHz for homing purposes only by search units.

4 SAR AGREEMENTS

4.1 SAR agreements have been concluded between Civil Aviation Authority of Singapore and the SAR authorities or agencies of Indonesia, Malaysia, Philippines, Thailand and Vietnam. These agreements provide for mutual assistance in the conduct of SAR operations within each others' SAR Regions (SRR) and approval for entry of SAR aircraft, vessels and personnel of one

State into the SRR of another State, with prior permission, for the purpose of conducting SAR operations or rendering SAR assistance and for direct communications between the SAR authorities or agencies on all common SAR matters.

4.2 Requests for the entry of aircraft, equipment and personnel from other States to engage in search for aircraft in distress or to rescue survivors of aircraft accidents should be transmitted to the Rescue Coordination Centre. Instructions as to the control which will be exercised on entry of such aircraft and/ or personnel will be given by the Rescue Coordination Centre in accordance with the standing plan for the conduct of search and rescue in the area.

4.3 Civil Aviation Authority of Singapore has also concluded an SAR agreement with the SAR Coordinator Pacific RCC, United States Air Force (USAF). The agreement provides for all possible assistance to assist RCC Singapore in its response to United States (US) military SAR incidents within the Singapore SRR. It will also provide US assistance to RCC Singapore in its prosecution of civil SAR incidents when requested.

5 CONDITIONS OF AVAILABILITY

5.1 The SAR service and facilities in Singapore are available without charge to neighbouring states on opportunity basis and upon request to the Rescue Coordination Centre Singapore or the Singapore Air Traffic Control Centre. All facilities are specialised in SAR techniques and functions.

6 PROCEDURES AND SIGNALS USED

6.1 Procedures and signals used by aircraft

6.1.1 Procedures for pilots-in-command observing an accident or intercepting a distress call and/or message are outlined in ICAO Annex 12, Chapter 5.

6.2 Communications

6.2.1 Transmission and reception of distress messages within the Singapore Search and Rescue Region are handled in accordance with ICAO Annex 10, Volume II, Chapter 5, para 5.3.

6.2.2 For communications during search and rescue operations, the codes and abbreviations published in *ICAO Abbreviations and Codes (Doc 8400)* are used.

6.2.3 Information concerning positions, callsigns, frequencies and hours of operation of Singapore aeronautical stations is published in sections AD 2 and ENR 2.

6.2.4 The frequency 121.5MHz is guarded continuously by the Control Tower, Singapore Changi Airport, the Singapore Air Traffic Control Centre and Control Tower, Seletar Aerodrome. The Coast Radio Station in Singapore guards the international distress frequencies.

6.2.5 Search and Rescue aircraft conducting Search and Rescue Operations will use the following callsigns:

a) Fixed Wing ‘Rescue (plus number 61 to 85)’
b) Rotary Wing ‘Rescue (plus number 10 to 19)’

6.2.6 Rescue vessels / boats conducting Search and Rescue Operations will use the following callsigns:

a) ‘Rescue Vessel (plus number 21 to 31)’
b) ‘Rescue Boat (plus number or callsign)’

6.3 Search and Rescue Signals

6.3.1 The search and rescue signals to be used are those prescribed in ICAO Annex 12, Chapter 5, paragraph 5.8.

6.3.2 Ground/Air Visual Signal Codes for use by Survivors

GROUND/AIR VISUAL SIGNAL CODES FOR USE BY SURVIVORS			
Nr.	***Message***	***Code symbol***	***Instructions for use***
1	Require assistance	**V**	a) Make signals not less than 8ft(2.5m). b) Take care to layout signals exactly as shown. Provide as much colour contrast as possible c) between signals and background. Make every effort to attract attention by other d) means such as radio, flares, smoke, reflected light.
2	Require medical assistance	**X**	
3	No or Negative	**N**	
4	Yes or Affirmative	**Y**	
5	Proceeding in this direction	↑	

6.4 Rescue Units and Facilities

RESCUE UNITS AND FACILITIES				
NAME	**AIRCRAFT**	**MARINE CRAFT**	**OTHER UNITS**	**REMARKS**
Singapore / MINDEF	LRG VLR HEL-M HEL-H	RV		
Singapore / Police Coast Guard		RV RV RV		
Singapore / Changi AES		RB		
Singapore in coordination with USA (Pacific Region RCC, PAC RCC Honolulu)	LRG			USAF LRG available at opportunity basis
Singapore Civil Defence Force		Basic Task Force (BTF) - RB - RV		
Pacific Flight Services	LRG VLR VLR VLR ELR			No ADS-B for King Air C90

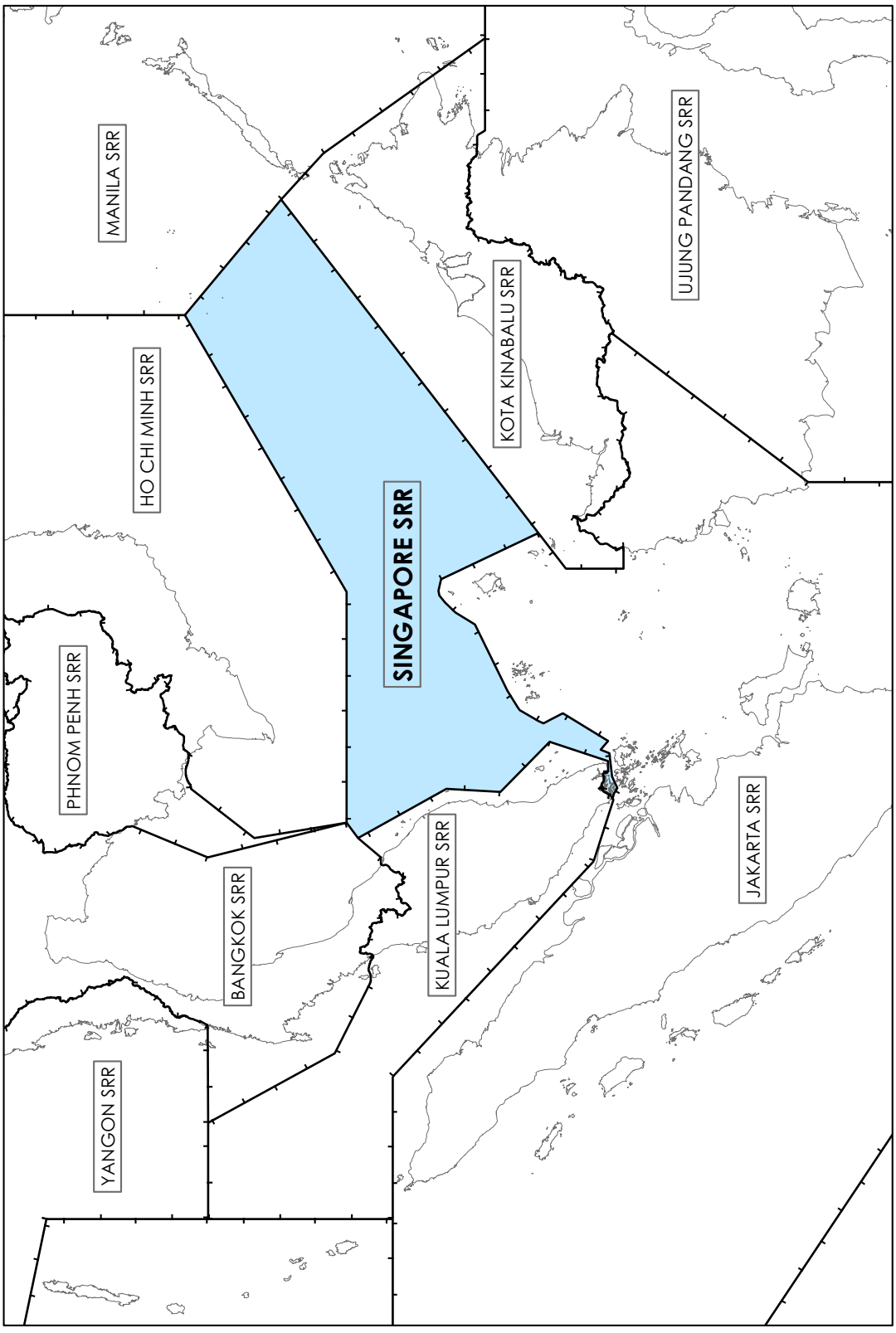
6.5 Search and Rescue Frequencies

SEARCH AND RESCUE FREQUENCIES			
Purpose	*Frequency*	*Period*	*Watch Kept By*
International Distress Frequencies	121.5 MHz	24 hours watch	RSAF (SATCC) RCC Singapore
	243.0 MHz	24 hours watch	RSAF (SATCC)
	156.8 MHz (Channel 16)	24 hours watch	Maritime and Port Authority Ships at sea.
	156.525 MHz (DSC Channel 70)	24 hours watch	Maritime and Port Authority Ships at sea.
Scene of SearchScene of Search	2 182 KHz	As required	RCC Singapore
	282.8 MHz	As required	Search Aircraft RCC Singapore
	123.1 MHz	As required	RCC Singapore Merchant Shipping (if equipped)
	3 023 KHz	As required	RCC Singapore
	5 680 KHz	As required	RCC Singapore

Note:

Speech circuits exist between all ATS Units in Peninsular Malaysia and Singapore. Speech circuits also exist between Singapore ATS Unit and Kota Kinabalu ATS Unit in Sabah. Direct speech communications circuits exist between Singapore ATS Unit and Jakarta, Manila and Ho Chi Minh ATS Units and are available for relay of messages between Singapore RCC and the respective RCCs but may be subject to delays.

SINGAPORE SEARCH AND RESCUE REGION (SRR)



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No.	MTOW x 1,000 Kg			Weight Factor
119.	426.34	-	430.53	128
120.	430.54	-	434.74	129
121.	434.75	-	438.95	130
122.	438.96	-	44318	131
123.	443.19	-	447.41	132
124.	447.42	-	451.65	133
125.	451.66	-	455.90	134
126.	455.91	-	460.16	135
127.	460.17	-	464.42	136
128.	464.43	-	468.70	137
129.	468.71	-	472.98	138
130.	472.99	-	477.26	139
131.	477.27	-	481.56	140
132.	481.57	-	485.86	141
133.	485.87	-	490.18	142
134.	490.19	-	494.49	143
135.	494.50	-	498.82	144
136.	498.83	-	503.15	145
137.	503.16	-	507.50	146
138.	507.51	-	511.84	147
139.	511.85	-	516.20	148
140.	516.21	-	520.56	149
141.	520.57	-	524.94	150
142.	524.95	-	529.31	151
143.	529.32	-	533.70	152
144.	533.71	-	538.09	153
145.	538.10	-	542.49	154
146.	542.50	-	546.90	155
147.	546.91	-	551.31	156
148.	551.32	-	555.73	157
149.	555.74	-	560.16	158
150.	560.17	-	564.60	159
151.	564.61	-	569.04	160
152.	569.05	-	573.49	161
153.	573.50	-	577.94	162
154.	577.95	-	528.41	163
155.	582.42	-	586.88	164
156.	586.89	-	591.35	165
157.	591.36	-	595.84	166
158.	595.85	-	600.33	167
159.	600.34	-	604.85	168
160.	604.83	-	609.33	169
161.	609.34	-	613.84	170
162.	613.85	-	618.36	171
163.	618.37	-	622.88	172

No.	MTOW x 1,000 Kg			Weight Factor
164.	622.89	-	627.41	173
165.	627.42	-	631.95	174
166.	631.96	-	636.49	175
167.	636.50	-	641.04	176
168.	641.05	-	645.59	177
169.	645.60	-	650.16	178
170.	650.17	-	654.73	179
171.	654.74	-	659.30	180
172.	659.31	-	663.88	181
173.	663.89	-	668.47	182
174.	668.48	-	673.07	183
175.	673.08	-	677.67	184
176.	677.68	-	682.27	185
177.	682.28	-	686.89	186
178.	686.90	-	691.51	187
179.	691.52	-	696.13	188
180.	696.14	-	700.76	189
181.	700.77	-	and so forth	190

ENR 0.6 TABLE OF CONTENTS

Note: The following sections in this chapter are intentionally left blank:
ENR 0.1, ENR 0.2, ENR 0.3, ENR 0.4 and ENR 0.5.

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6.2.4 A pilot-in-command under IFR or VFR intending to enter, cross or operate within a CTR or ATZ shall request a clearance from the Aerodrome/Approach Control on the appropriate radio frequency. He shall:

a) Pass the aircraft's position, level, track and estimated time of crossing the zone boundary;
b) Maintain a continuous listening watch on that frequency while the aircraft is within the zone;
c) Navigate in accordance with the flight plan and ATC clearance;
d) Carry out any instructions received from Aerodrome/Approach Control.

6.2.5 All flights within a CTR, at night or in IMC, shall be conducted in accordance with IFR or special authorisation by ATC. However, in order to expedite traffic, ATC may clear an aircraft for a visual approach if weather conditions permit.

6.2.6 Special VFR Flight

6.2.6.1 A Special VFR flight is a VFR flight cleared by air traffic control to operate within a control zone in meteorological conditions below VMC.

6.2.6.2 Special VFR flights may be authorised to enter a control zone for the purpose of landing or to take-off and depart directly from a control zone when the ground visibility is not less than 1.5km (1 mile). The pilot of an aircraft on a Special VFR flight:

a) Must comply with ATC instructions;
b) Is responsible for ensuring that his flight conditions enable him to remain clear of cloud, determine his flight path with reference to the surface and keep clear of obstructions;
c) Is responsible for ensuring that he flies within the limitations of his licence. Controllers are not responsible for checking pilot's qualifications.

6.2.6.3 A Special VFR clearance shall be issued only when specifically requested by a pilot.

6.2.6.4 Before clearing a Special VFR flight a controller must consider the prevailing traffic conditions, the extent of the proposed flight and the availability of air/ground communications. IFR flights take precedence over Special VFR flights. Standard separation shall be provided:

a) Between IFR flights and Special VFR flights;
b) Between flights operating on Special VFR clearance except where a reduction is specifically authorised by CAAS.

6.2.6.5 Aircraft on Special VFR clearance are not normally given a specific height to fly but for the purpose of ensuring vertical separation from other aircraft flying above, the Special VFR flight may be required to fly not above a specified level.

6.3 SEPARATION MINIMA

6.3.1 All VFR or IFR flights within CTRs will be regulated in accordance with IFR separation standards unless the conditions stated in ENR 1.7 para 4.10.2 prevail. ATC Services are also provided to aircraft within ATZs.

6.4 WAKE TURBULENCE SEPARATION MINIMA

6.4.1 For arrival aircraft operating into Singapore Changi Airport, distance-based wake turbulence separation minima based on the ICAO seven wake turbulence groups will be applied.

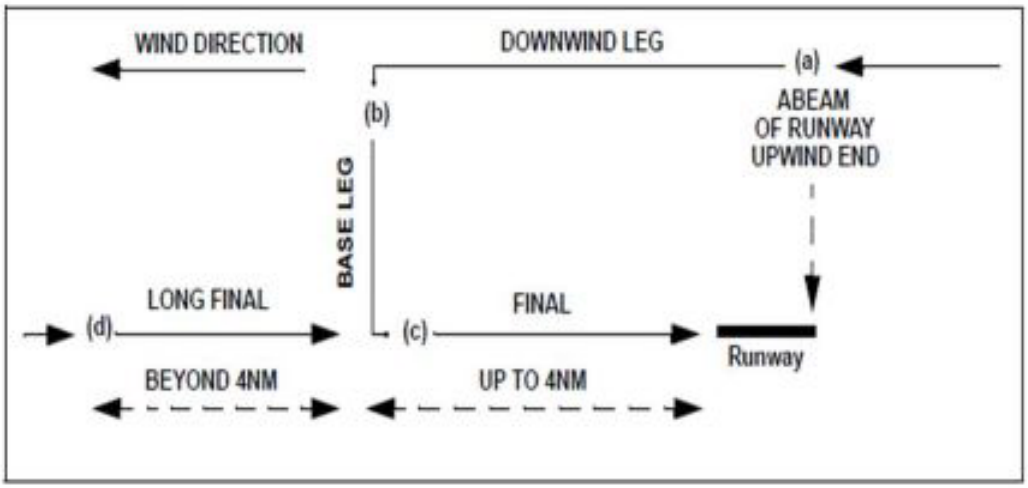
Group	Weight	Wingspan
A	136,000kg or more	Less than or equal to 80m but greater than 74.68m
B		Less than or equal to 74.68m but greater than 53.34m
C		Less than or equal to 53.34m but greater than 38.1m
D	Less than 136,000kg but more than 18,600Kg	Greater than 32m
E		Less than or equal to 32m but greater than 27.43m
F		Less than or equal to 27.43m
G	18,600kg or less	N.A.

6.4.2 The wake turbulence separation minima are as follows:

<table>
<tr><td colspan="2" rowspan="2"></td><td colspan="7">SUCCEEDING</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td></tr>
<tr><td rowspan="7">PRECEEDING</td><td>A</td><td></td><td>4 NM</td><td>5 NM</td><td>5 NM</td><td>6 NM</td><td>6 NM</td><td>8 NM</td></tr>
<tr><td>B</td><td colspan="2"></td><td>4 NM</td><td>4 NM</td><td>5 NM</td><td>5 NM</td><td>7 NM</td></tr>
<tr><td>C</td><td colspan="4"></td><td>3.5 NM</td><td>3.5 NM</td><td>6 NM</td></tr>
<tr><td>D</td><td colspan="5" rowspan="2">3 NM</td><td colspan="2">4 NM</td></tr>
<tr><td>E</td><td colspan="2">4 NM</td></tr>
<tr><td>F</td><td colspan="7"></td></tr>
<tr><td>G</td><td colspan="7"></td></tr>
</table>

6.5 VISUAL CIRCUIT REPORTING PROCEDURE

6.5.1 The pilot-in-command shall report position in accordance with the following diagram



a) Downwind
Aircraft shall report “Downwind” abeam the upwind end of the runway.

b) Base Leg
Aircraft shall report “Base Leg” on completion of the turn on to base leg.

c) Final
Aircraft shall report “Final” after completion of the turn on to final approach, not more than 4NM from the approach end of the runway.

d) Long Final
Aircraft flying a straight-in approach shall report “Long Final” 8NM from the approach end of the runway, and “Final” when at 4NM.

Note: At grass aerodrome, the area to be used for landing is regarded as the runway for the purposes of reporting position in the circuit.

6.6 USE OF RUNWAY

6.6.1 The Aerodrome Controller will nominate the runway direction according to prevailing conditions.

6.6.2 Notwithstanding the runway direction nominated by ATC, the pilot-in-command shall ensure that there is sufficient length of run and that the crosswind or downwind component is within the operational limits of each particular operation. If the nominated runway direction is not suitable for these reasons or for any other safety reason, he may request for an alternative runway direction. ATC will grant the use of an alternative runway direction but the flight may be subject to some delay because of other traffic.

6.6.3 The decision to undertake a take-off or landing rests solely with the pilot-in-command.

6.6.4 Unless prior permission has been obtained from ATC, the pilot-in-command shall not hold on the runway in use.

6.6.5 Only one aircraft will be cleared to land on the runway in use at any one time.

6.6.6 In VMC, an aircraft may be cleared to continue approach to a runway occupied by a preceding aircraft but clearance to land will not be given until the runway is vacated.

6.7 CLOSURE OF AERODROMES

6.7.1 Aircraft will not be refused permission to land or take off from airfields in the Singapore FIR solely because of adverse weather conditions. The pilot-in-command of a public transport aircraft shall be responsible for operation in accordance with applicable company weather minima.

6.7.2 Aerodrome will be closed:

a) When the surface of the landing area is unfit (e.g. soft surface or dangerous obstruction on the manoeuvring area); or
b) At such other times and in conditions specified by NOTAM.

6.7.3 In an emergency, an aircraft will be permitted to land regardless of the conditions of the aerodrome and aerodrome facilities, but the pilot will be advised of these conditions.

6.8 REGULATING OF AIR TRAFFIC MOVEMENTS AFTER CLOSURE OF SINGAPORE CHANGI AIRPORT'S RUNWAY/ CONTROL ZONE

6.8.1 In order to prevent unnecessary air traffic congestion which normally occurs following the resumption of air traffic operations after the closure of the Singapore Changi Airport’s Runways/Control Zone, due to VIP Movement or Major Air Exercise, slot-times will be introduced to regulate the flow of aircraft which are scheduled to depart for a period of at least one hour after the commencement of operations. Thus, depending on the prevailing traffic conditions all such departures will be spaced at intervals of 5 minutes or more to minimise unnecessary delays on the ground, which may be caused by arriving aircraft.

6.8.2 During the one hour period, pilots will be required to give ATC 5 minutes notice prior to starting engines.

6.8.3 Slot time is defined as the time during which take-off clearance may be expected.

6.9 AIR TRAFFIC CONTROL CLEARANCES

6.9.1 All flights within a CTR, or ATZ, irrespective of weather conditions, require an air traffic control clearance.

6.9.2 The pilot-in-command of an aircraft departing from a CTR or an ATZ shall obtain an air traffic control clearance prior to departure.

6.9.3 A clearance to enter or cross a CTR or ATZ will include the following information:

a) A clearance limit and holding instructions, if necessary;
b) The route to be flown; and
c) The altitude or flight level.

6.10 NOISE ABATEMENT PROCEDURE

6.10.1 To alleviate the problem of noise, all aircraft on AWY G579 between SINJON and GUMPU shall operate at/above 5,000ft.

6.11 SPEED CONTROL PROCEDURES FOR ARRIVALS INTO AIRPORTS IN SINGAPORE

6.11.1 Speed control procedures are in force unless notified otherwise by ATC or on ATIS.

6.11.2 All arriving turboprop and turbo-jet aircraft are to fly not faster than indicated air speed 250 knots when within 40NM from airports in Singapore or when at or below 10,000ft. Aircraft cleared on RNAV STARS must comply with the published speed restrictions and transitions unless otherwise instructed by ATC.

6.11.3 All arrivals into Singapore Changi Airport instructed to intercept the final approach course, are to maintain 180 knots by 8NM from touchdown, and thereafter 150 knots till 4NM from touchdown.

6.11.4 Pilots who are unable to comply with the speed limits specified above for reasons of flight safety and/or weather must provide timely notifications to ATC and state the acceptable speed(s) which is appropriate.

6.12 AUTHORIZATION

6.12.1 Either an IFR clearance or a Special VFR authorisation shall be issued by Air Traffic Control prior to every movement within a control zone in the following weather conditions:

When the ceiling is less than 1,500ft and/or a visibility less than 5km.

6.12.2 The deciding factors determining whether conditions are such that compliance with IFR or Special VFR authorisation is required will be the official meteorological observations.

6.12.3 When a pilot so requests and traffic conditions permit, Special VFR flight may be authorised within control zones, clear of cloud and in sight of land or water.

6.12.4 When a Special VFR flight has been authorised, ATC will provide it with standard separation from other similar flights and any IFR flight.

6.12.5 Special VFR flights will not normally be given a special level to fly; they will be merely instructed to remain clear of cloud and in sight of land or water. If, however, it is necessary to provide vertical separation from aircraft above, the Special VFR flight will be instructed not to fly above a certain level.

6.12.6 A Special VFR flight may be required to make good a prescribed track. When no track is prescribed, the pilot must fly directly towards his destination or towards the first turning point shown in the flight plan.

6.12.7 Special VFR absolves the pilot from complying with Instrument Flight Rules. Special VFR flight does not, however, absolve the pilot-in-command from the responsibility of maintaining minimum safe levels as prescribed in Part 2, para 5 of the eleventh Schedule of the Air Navigation Order. He must comply with ATC instructions and it will be entirely his responsibility to ensure that his flight conditions i.e. forward visibility and distance from cloud, will enable him to determine his flight path and remain clear of all obstructions.

6.12.8 Authorisation for Special VFR flight will depend not only upon zonal traffic conditions but also whether or not air/ground communications can be maintained and the extent of the flight proposed.

6.13 APPLICATION OF GENERAL FLIGHT RULES

6.13.1 Aircraft flying under Special VFR authorisation are subject to the general flight rules. Compliance with these rules is the responsibility of the pilot.

7 REQUIREMENTS FOR AERIAL PHOTOGRAPHY

7.1 Section 7 of the Air Navigation Act provides that no aerial photography of protected places in Singapore may be undertaken without the written permission of the Director-General of Civil Aviation. Applications for Aerial Photography Permits must be submitted in duplicate, one copy to the Director-General of Civil Aviation and the other copy to the Head, Field Security Branch, MINDEF, at least ten (10) days prior to the date of the photography flight.

8 LIGHT SIGNALS

Appendix A

Light	From Aerodrome Control To:	
Directed towards aircraft concerned	Aircraft in Flight	Aircraft on the Ground
STEADY GREEN	Cleared to land	Cleared for take-off
STEADY RED	Give way to other aircraft and continue circling	Stop
SERIES OF GREEN FLASHES	Return for landing *	Cleared to taxi
SERIES OF RED FLASHES	Aerodrome unsafe, do not land	Taxi clear of landing area in use

Light	From Aerodrome Control To:	
SERIES OF WHITE FLASHES	Land at this aerodrome and proceed to apron *	Return to starting point on the aerodrome

* Clearance to land and to taxi will be thereafter given as a steady green light and a series of green flashes respectively.

9 DATA LINK SERVICES IN SINGAPORE FIR

9.1 BACKGROUND

9.1.1 Controller Pilot Data Link Communications (CPDLC) and Automatic Dependent Surveillance (ADS) data link applications will be used to provide services to FANS 1/A equipped aircraft, in particular within the Singapore FIR beyond the range of existing radar / ADS-B and VHF voice communications. Area Navigation (RNAV) routes suitable for ADS-C and / or CPDLC logon are described in ENR 3.2.

9.1.2 Messages will be transferred by VHF and satellite data link.

9.1.3 CPDLC supports the following services:

a) Emergency alerting;
b) Pilot to Controller downlink of position reports and clearance requests;
c) Controller to Pilot uplink of ATC clearances and instructions; and
d) Free text as a supplement to pre-formatted message elements.

9.1.4 Pre-Departure Clearance (PDC) via CPDLC is available on selected ATS routes/destinations as described in WSSS AD 2.22 paragraph 8.4.

9.1.5 Automatic Dependent Surveillance (ADS) supports automatic reporting by the aircraft Flight Management System (FMS) of aircraft position and intent information. The FMS reports the required information in accordance with parameters selected by the ground system.

9.2 LOGON PROCEDURES

9.2.1 The AFN LOGON address for the Singapore FIR is WSJC.

9.2.2 To avoid automatic rejection of the LOGON, the flight identification number used by the pilot in the LOGON process must be identical to the flight identification number filed in the flight plan.

9.2.3 A LOGON must be received from the aircraft before any data link connections can be initiated by the ground system. This is achieved via the ATS facility notification (AFN) LOGON process to be initiated by the pilot in accordance with company procedures.

9.2.4 Aircraft requesting data link services inbound to Singapore FIR are required to manually LOGON onto WSJC at least 10 minutes prior to the estimated time for entering Singapore FIR. Data link equipped aircraft departing from aerodromes within the Singapore FIR and requesting data link may LOGON to WSJC prior to departure. Pilots who are unable to establish a data link connection are to inform ATC on VHF or HF RTF.

9.2.5 Pilots are reminded to provide the flight level on first contact with HF, including when established on data link.

9.3 APPLICATION OF CPDLC

9.3.1 Aircraft operating outside radar coverage and not in the ADS-B exclusive airspace within the Singapore FIR shall establish contact with ATC using CPDLC as a primary means of communication except for the following:

a) prior instruction to contact ATC on VHF;
b) receive notice that CPDLC service is not available; and
c) during data link outage.

9.3.2 To ensure the correct synchronisation of messages, controller/pilot dialogues opened by CPDLC must be closed by CPDLC. Controller/pilot dialogues opened by voice must be closed by voice.

9.3.3 Due to inherent integrity checks and a coded reference to any preceding related message contained within CPDLC messages, a clearance issued by CPDLC requires only the appropriate CPDLC response, not a read-back as would be required if the clearance had been issued by voice.

9.3.4 The down link response “WILCO” indicates that the pilot accepts the full terms of the whole uplink message.

9.3.5 A down link response “AFFIRM” is not an acceptable acknowledgement or reply to a CLEARANCE issued by CPDLC.

9.3.6 To avoid ambiguity in message handling and response, a CPDLC downlink message should not contain more than one clearance request.

9.3.7 If multiple clearance requests are contained in a single downlink message and the controller cannot approve all requests, the uplink message element “UNABLE” will be sent as a response to the entire message. A separate message containing a response to those requests that can be complied with will be sent by the controller.

9.3.8 If any ambiguity exists as to the intent of a particular message, clarification must be sought by voice.

9.3.9 Standard pre-formatted message elements must be used whenever possible. Free text messages should be used only when an appropriate pre-formatted message element does not exist or to supplement the pre-formatted message element. The use of free text should be kept to a minimum.

9.3.10 When CPDLC connection is established, aircraft will be instructed to transfer from voice to CPDLC.
The phraseology used is:
TRANSFER TO SINGAPORE CONTROL ON DATA LINK [position];
MONITOR [HF frequency primary/secondary]

9.3.11 Pilots should down link a CPDLC position report upon position over first compulsory reporting point when aircraft enters Singapore FIR.

9.3.12 CPDLC connections will be terminated at the FIR boundary position or when entering radar coverage. The CONTACT [unit name][frequency] message and the END SERVICE message will be sent as separate messages. The END SERVICE message will be sent as soon as possible after receipt of the WILCO response to the CONTACT message.

9.4 APPLICATION OF ADS

9.4.1 ADS Periodic contracts will be established automatically on receipt of a LOGON.

9.4.2 The Periodic reporting rate is 10 minutes for aircraft operating outside radar coverage and 20 minutes for aircraft operating within radar coverage.

9.4.3 For ADS logged-on aircraft, CPDLC position reports are required only when aircraft enters Singapore FIR upon the first compulsory reporting point.

9.4.4 ADS contracts will be terminated automatically at a system parameter time after the aircraft has left the Singapore FIR.

9.5 DATA LINK FAILURE

9.5.1 Pilots recognising a failure of a CPDLC connection must immediately establish communications on the appropriate voice frequency. When voice communications have been established, voice must continue to be used as the primary medium until a CPDLC connection has been re-established and the controller has authorised the return to data link.

9.5.2 In the event of an expected CPDLC shutdown, the controller will immediately advise all data link connected aircraft of the failure by voice. Instructions will continue to be issued by voice until the return of the data link system. The return of the system to an operational state will require a new AFN LOGON from the affected aircraft.

9.6 FLIGHT PLAN NOTIFICATION

9.6.1 Aircraft planning to utilise data link communications must annotate their ICAO flight plan as follows:

a) Data link communication serviceability and capability must be notified by inserting one or more of the following letters in Item 10a (radio communication, navigation and approach aid equipment and capabilities):

J1	CPDLC ATN VDL Mode 2
J2	CPDLC FANS 1/A HFDL
J3	CPDLC FANS 1/A VDL Mode A
J4	CPDLC FANS 1/A VDL Mode 2
J5	CPDLC FANS 1/A SATCOM (INMARSAT)
J6	CPDLC FANS 1/A SATCOM (MTSAT)
J7	CPDLC FANS 1/A SATCOM (Iridium)
P1	CPDLC RCP 400
P2	CPDLC RCP 240
P3	SATVOICE RCP 400
P4-P9	Reserved for RCP

b) Aircraft registration must be inserted in Item 18 as the ground system uses the information during the AFN LOGON.

c) Serviceable ADS equipment carried must be annotated on the flight plan by adding one or more of the following descriptors to describe the serviceable surveillance equipment and/or capabilities on board:

B1	ADS-B with dedicated 1090MHz ADS-B “out” capability
B2	ADS-B with dedicated 1090MHz ADS-B “out” and “in” capability
U1	ADS-B “out” capability using UAT
U2	ADS-B “out” and “in” capability using UAT
V1	ADS-B “out” capability using VDL Mode 4
V2	ADS-B “out” and “in” capability using VDL Mode 4
D1	ADS-C with FANS 1/A capabilities
G1	ADS-C with ATN capabilities

d) Additional surveillance equipment or capabilities are to be listed in Item 18 following the indicator SUR/ .

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ENR 1.3 INSTRUMENT FLIGHT RULES

1 GENERAL

1.1 In instrument meteorological conditions pilots shall operate in accordance with the instrument flight rules except that within a control zone, a special VFR flight may be authorised.

2 APPLICABLE INSTRUMENT FLIGHT RULES

2.1 Flights shall be conducted in accordance with the Instrument Flight Rules (even when not operating in instrument meteorological conditions) when operated:

a) More than 185km (100NM) seaward from the shoreline within controlled airspace; or
b) During the hours between sunset and sunrise; or
c) Above FL200.

3 DIRECT ROUTING OPERATIONS (DRO) – GENERAL PROCEDURES

3.1 *APPLICABLE ROUTES AND FLIGHT PLANNING PROCEDURES*

3.1.1 Direct routes are available on specified segments of ATS routes. Flights operating at FL290 to FL460 (both inclusive) should flight plan using the direct routes listed in the table below where applicable:

Flight planning on ATS routes	**Flight planning for DRO (24-hours)**	**Remarks**	**Reduction in distance flown (NM)**
VMR L642 ENREP M753 IPRIX	VMR L642 EGOLO DCT IPRIX	Applicable to northbound flights	1.1
IPRIX M753 ENREP L642 VMR	IPRIX DCT EGOLO L642 VMR	Applicable to southbound flights	1.1
PARDI G579 SJ B469 PU	PARDI DCT PU	Applicable to flights operating at FL290 to FL600 (both inclusive)	1.9
DUDIS L644 LIGVU	DUDIS DCT LIGVU	NIL	2.2
MELAS N892 MABAL	MELAS DCT MABAL	Applicable to Changi arrivals joining MABAL STAR and flights on ATS route N892	2.3
ESPOB L642 EGOLO	ESPOB DCT EGOLO	NIL	4.6
ESPOB Q801 ESBUM Q802 ELALO	ESPOB DCT ELALO	Applicable to Changi arrivals joining ELALO STAR	5.4

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ENR 1.6 ATS SURVEILLANCE SERVICES AND PROCEDURES

1 PRIMARY RADAR

1.1 DESCRIPTION OF PRIMARY RADAR SERVICES AND PROCEDURES

1.1.1 Surveillance services will be provided to aircraft operating in controlled airspace subject to surveillance coverage, equipment serviceability and situations that may result in a degradation of ATS provision.

1.1.2 Flight information service may be provided using ATS surveillance to aircraft operating in uncontrolled airspace subject to surveillance and communication coverage, and air traffic conditions. Pilot may request for the following:

a. Information regarding any aircraft observed to be on a conflicting path with the identified aircraft and suggestions or advice regarding avoiding action; and
b. Information on the position of significant weather and, as practicable, advice to the aircraft on how best to circumnavigate any such areas of adverse weather; and
c. Information to assist the aircraft in its navigation.

Aircraft receiving flight information services are not obliged to follow the advice and/or suggestions given by ATC.

1.1.3 Aircraft operating in uncontrolled airspace, intending to enter or cross controlled airspace shall seek ATC clearance to do so. ATC will identify the aircraft and provide ATS surveillance service prior to entering controlled airspace.

1.1.4 The pilot-in-command is responsible for navigation and obstacle clearance when operating on established ATS routes and instrument flight procedures. However, for purpose of ensuring separation and expeditious flow of traffic, ATC may instruct pilots to fly specific headings for an IFR flight to be vectored and/or provide direct routing which takes the aircraft off an ATS route or an instrument flight procedure. Under such circumstance, ATC will issue clearance such that the prescribed obstacle clearance will always exist until the aircraft reaches the point where pilots will resume own navigation.

1.1.5 Position information will be given as follows:

a. A well-known geographical position;
b. Bearing and distance (using points of the compass) from a known position;
c. Magnetic heading (QDM) and distance to the appropriate reporting point or en-route navigational facility;
d. A distance to the runway touchdown point (as “track miles” to run).

1.1.6 Aircraft will be identified by ATC before providing ATS surveillance services using one of the following methods:

a. By a pilot report over a prescribed position displayed on the radar map or plotted on the radar map outlay;
b. By instructing a pilot to carry out turn(s) and ATC observing the executed turn(s);
c. By observing and correlating the radar echo of a departing aircraft to a known airborne time.

1.1.7 It is not possible to specify separation minima between identified aircraft and unknown traffic considered to constitute a hazard due to unpredictable manoeuvres of the latter. However, whenever practicable, the minimum surveillance separation shall be applied.

1.2 SINGAPORE AIR TRAFFIC CONTROL UNITS

1.2.1 Singapore ATC will use the following callsigns when providing ATS surveillance services:

a. Aircraft provided with Area Control Service (ACC)
    i. Singapore Radar;
    ii. Singapore Control.

b. Aircraft provided with Approach Control Service (APP)
    i. Singapore Approach;
    ii. Singapore Arrival;
    iii. Singapore Departure;
    iv. Seletar Approach.

1.3 MILITARY RADAR UNITS AUTHORISED TO PROVIDE RADAR CROSSING SERVICE

1.3.1 The Military Radar Units authorised to provide radar crossings of controlled areas (airways) by military aircraft are:

a. RSAF 201 Squadron (Air Defence Radar Unit-ADRU); and

b. RSAF 203 Squadron (Singapore Air Traffic Control Centre)

1.4 RADAR FAILURE

1.4.1 In the event of radar failure, instructions will be issued by the radar controller to restore standard longitudinal, lateral or vertical separation between those aircraft operating with radar separation. Instructions may also be given to aircraft to communicate on another ATC frequency.

1.5 RADIO FAILURE

1.5.1 In the event of failure of two-way communications while operating on the radar frequency, the pilot shall change to any other alternative ATC frequencies and request instructions.

1.5.2 If able to receive but not transmit, the pilot shall remain on the frequency on which he has been communicating and comply with instructions issued by the radar controller designed to establish that the aircraft is receiving. If this is established, further instructions appropriate to the circumstances will be issued.

1.5.3 If unable to make contact on the alternative frequencies, the pilot shall comply with the standard radio failure procedures as specified below.

1.6 TOTAL RADIO COMMUNICATION FAILURE PROCEDURES

1.6.1 If total radio communication failure occurs in VMC during daylight hours, the pilot shall continue to fly in VMC and land at the most suitable aerodrome. If it occurs in VMC during the hours of darkness (between sunset and sunrise) action shall be taken in accordance with paragraph 1.6.2 below.

1.6.2 If total radio communication failure occurs in IMC, ATC action is based on the assumption that the aircraft will continue to its destination and if unable to land, will proceed to its nominated alternate. Separation standards will be increased and airspace reserved accordingly (see Appendices ‘A’ and ‘B’).

1.6.3 In IMC, or if unable to maintain VFR, the pilot shall either leave or avoid controlled airspace and areas of dense traffic and establish VFR operation or, alternatively, shall:

a. Proceed according to the current flight plan, at the last assigned flight level, to the clearance limit and thereafter at the flight plan level.

b. Arrive at the destination as close as possible to ETA.

c. Commence descent as close as possible to EAT (or ETA if no EAT has been acknowledged).

d. If unable to land within 30 minutes of the time descent should have started (i.e. EAT or ETA if no EAT has been acknowledged), proceed to cross SAMKO Holding Area (SHA) at 4,000ft then via A457 at FL200 if Kuala Lumpur is the nominated alternate or via B470 at FL290 if Soekarno- Hatta is the nominated alternate or otherwise proceed at the planned flight level to other nominated alternate.

Note:

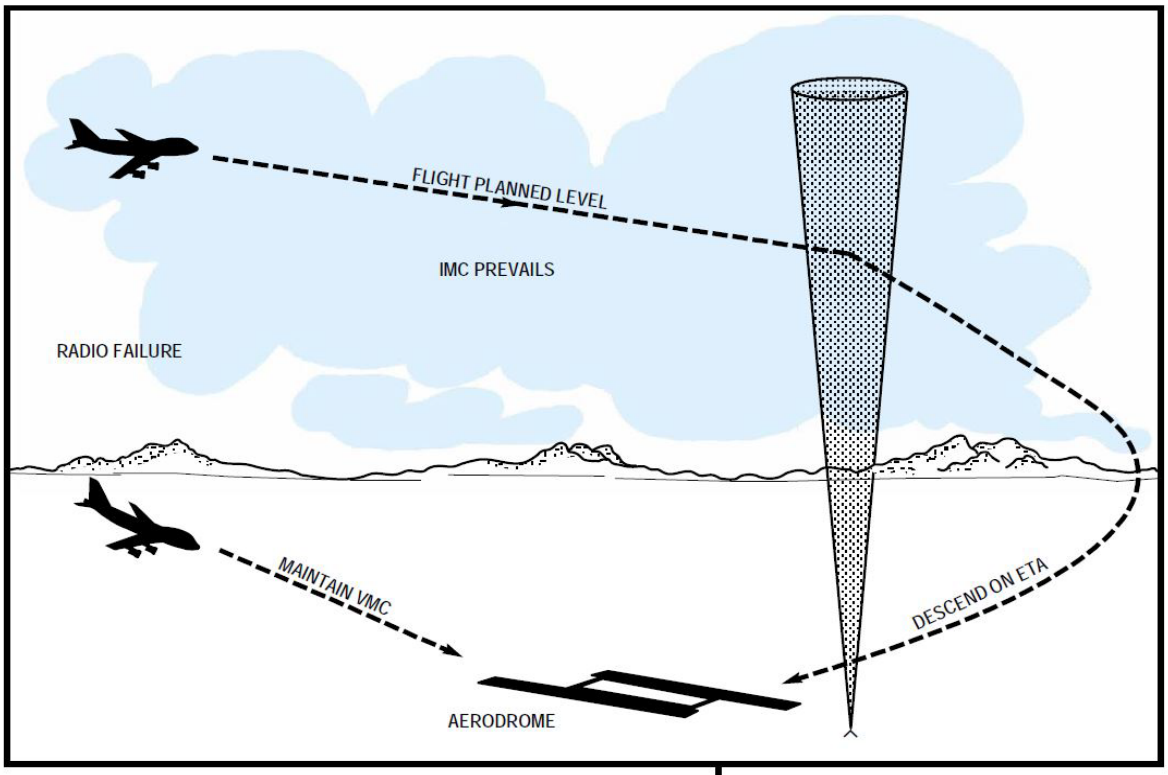
1) Aircraft are to follow the established radio failure procedures as laid down by the respective airports.

2) During this 30 minute period ATC will reserve the airspace at the aircraft’s flight level and below. At the expiry of this period with the concurrence of other users normal operations will resume.

1.6.4 In all cases, the pilot shall contact ATC as soon as possible after landing.

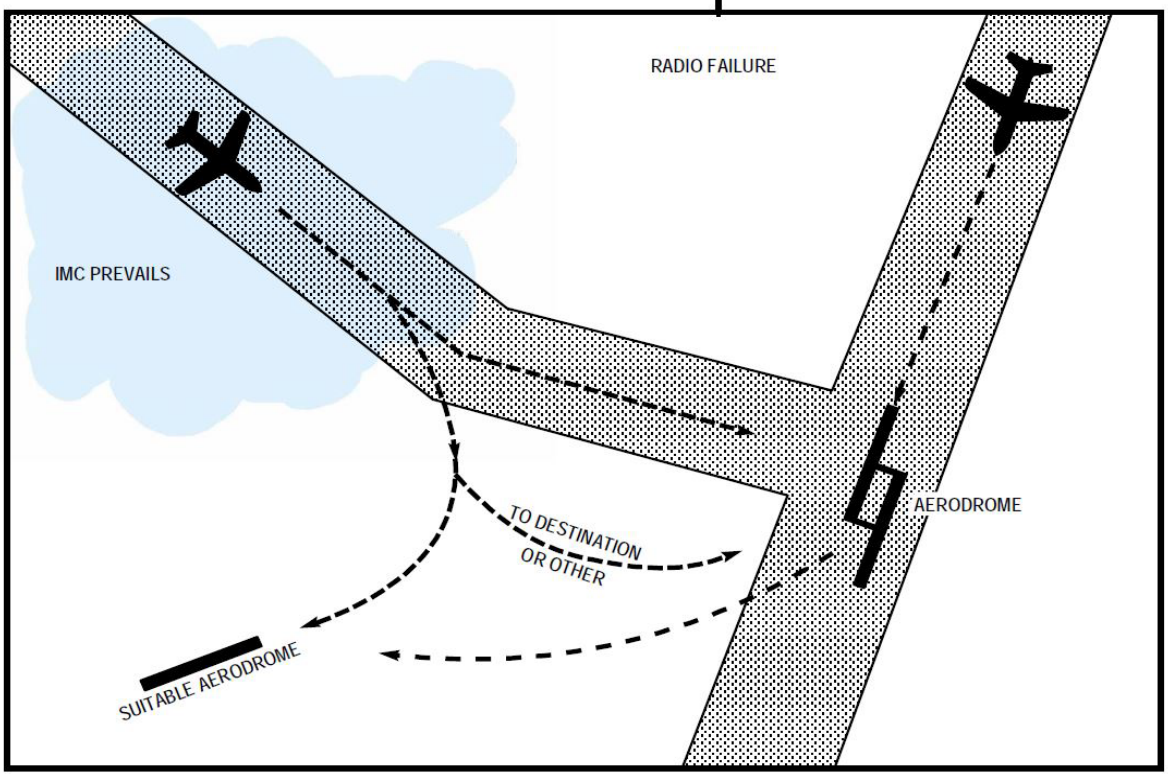
PILOT PROCEDURE FOR RADIO FAILURE

APPENDIX 'B'



IF IFR, DIVERT OFF AIRWAYS, ESTABLISH VMC AND LAND AT SUITABLE AERODROME OR, PROCEED IN STRICT ACCORDANCE WITH CLEARANCE OR FLIGHT PLAN TO DESTINATION.

IF VFR, MAINTAIN VMC TO DESTINATION OR OTHER SUITABLE AERODROME



2 SECONDARY SURVEILLANCE RADAR (SSR)

2.1 DESCRIPTION OF SSR OPERATING PROCEDURES

2.1.1 All aircraft operating in controlled airspace where Singapore is responsible for the provision of ATS are required to operate SSR transponders selecting Mode 3/A (4096 codes) and Mode C simultaneously.

2.1.2 Aircraft departing Singapore shall operate transponders in accordance with instructions given by ATC.

2.1.3 Pilots who have received specific instructions from ATC concerning the setting of the transponder shall maintain that setting except in circumstances detailed in paragraphs 2.2, 2.3 and 2.4 below.

2.1.4 Aircraft bound for Singapore shall operate on the SSR code last assigned to them by the adjacent FIR, or if no code has been previously assigned, advise the ATC unit concerned who will provide the required code.

2.1.5 Aircraft will be identified by ATC before providing ATS surveillance services using one of the following methods:

a. Verification of compliance to assigned discrete SSR transponder code;
b. Observation of compliance with an instruction to set a specific SSR transponder code;
c. Observation of compliance with an instruction to squawk IDENT.

2.2 EMERGENCY PROCEDURES

2.2.1 Pilot(s) of aircraft encountering a state of emergency shall set their transponder as follows:

NATURE OF EMERGENCY	TRANSPONDER CODE
Lost C2 Link state	7400
Unlawful Interference	7500
Radio Failure	7600
General Emergency	7700

2.3 RADIO COMMUNICATION FAILURE

2.3.1 Aircraft experiencing total radio communication failure shall set transponder code as per paragraph 2.2.1 and adopt the procedures specified in paragraph 1.6

2.3.2 Aircraft experiencing partial radio communication failure shall set transponder code as per paragraph 2.2.1. The possible scenarios are:

a. Aircraft is unable to receive ATC transmissions, pilots shall adopt the appropriate procedures specified in paragraph 1.6 to 1.13.
b. Aircraft can receive ATC transmissions, ATC will continue to issue instructions and/or clearances to pilots. Such instructions and clearances will be repeated. Pilots may squawk ident to acknowledge.

2.4 SYSTEM OF SSR CODE ASSIGNMENT

2.4.1 Aircraft operating in the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1) will be assigned the following codes except for those aircraft already assigned codes by adjacent FIRs:

INTERNATIONAL	DOMESTIC
0100 - 0177	0001 - 0077
2200 - 2277	4200 - 4277
	4300 - 4377
	4600 - 4677

2.5 VOICE AND CPDLC POSITION REPORTING REQUIREMENTS

2.5.1 There are no voice and CPDLC position reporting requirements for the SSR coverage area stipulated in paragraph 2.6.1.

2.6 AREA OF SSR COVERAGE

2.6.1 Maximum operating range of the SSR is 250 NM from Singapore Changi Airport.

3 AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST (ADS-B)

3.1 DESCRIPTION OF ADS-B OPERATING PROCEDURES IN ADS-B OUT EXCLUSIVE AIRSPACE

3.1.1 Aircraft that operate within Singapore FIR at or above F290 must carry serviceable ADS-B transmitting equipment that has been certified as meeting:

a. European Aviation Safety Agency - Certification Considerations for the Enhanced ATS in Non-Radar Areas using ADS-B Surveillance (ADS-B-NRA) Application via 1090MHz Extended Squitter (AMC 20-24), or
b. European Aviation Safety Agency (EASA) CS-ACNS (Subpart D - Surveillance - SUR), or
c. Federal Aviation Administration - Advisory Circular No: 20-165A (or later versions) Airworthiness Approval of Automatic Dependent Surveillance - Broadcast (ADS-B) Out Systems, or
d. An 'approved ADS-B Out equipment configuration' as specified in Part 91 (General Operating and Flight Rules) Manual of Standards 2020, issued by the Civil Aviation Safety Authority of Australia.

3.1.2 Aircraft that does not comply with the requirements stipulated in paragraph 3.1.1 will not be accorded priority in the delineated airspace and flight level assignments would be subjected to air traffic conditions.

3.1.3 If an aircraft carries ADS-B transmitting equipment but does not comply with the requirements stipulated in paragraph 3.1.1, the equipment must be deactivated or set to transmit only a value of zero for the Navigation Uncertainty Category - Position (NUC-P) or Navigation Integrity Category (NIC).

3.1.4 Aircraft will be identified by ATC before providing ATS surveillance services using one of the following methods:

a. Direct recognition of the aircraft identification in an ADS-B label displayed to ATC on their air situation display system;
b. Observation of compliance with an instruction to TRANSMIT ADS-B IDENT.

3.2 EMERGENCY PROCEDURES

3.2.1 The pilot-in-command, upon awareness of an onboard ADS-B equipment failure, must inform ATC as soon as possible. ATC would then provide the necessary clearance to ensure separation with other flights operating in the delineated airspace as stipulated in paragraph 3.1.1.

3.2.2 Pilot(s) of aircraft encountering a state of emergency shall set their transponder as stipulated in paragraph 2.2.1.

3.3 RADIO COMMUNICATION FAILURE

3.3.1 Aircraft experiencing total radio communication failure shall set transponder code as per paragraph 2.2.1 and adopt the procedures specified in paragraph 1.6

3.3.2 Aircraft experiencing partial radio communication failure shall set transponder code as per paragraph 2.2.1. In the event whereby:

a. Aircraft is unable to receive ATC transmissions, pilots shall adopt the appropriate procedures specified in paragraph 1.6 to 1.13.
b. Aircraft can receive ATC transmissions, ATC will continue to issue instructions and/or clearances to pilots. Such instructions and clearances will be repeated. Pilots may squawk ident to acknowledge.

3.4 FLIGHT PLANNING REQUIREMENTS

3.4.1 Aircraft operators complying with the requirements stipulated in paragraph 3.1.1 are to indicate the appropriate ADS-B designator in Field 10b of the ICAO flight plan:

a. B1: ADS-B with dedicated 1090 MHz ADS-B "out" capability
b. B2: ADS-B with dedicated 1090 MHz ADS-B "out" and "in" capability

3.4.2 Aircraft operators are to include the aircraft address (24 bit Code) in hexadecimal format in Field 18 of the ICAO flight plan as per the following example: CODE/7C432B

3.4.3 Aircraft identification (ACID) not exceeding 7 characters must be accurately indicated in Field 7 of the ICAO flight plan and replicated exactly when set in the aircraft avionics (for transmission as Flight ID) as follows:

a. The three-letter ICAO designator of the aircraft operator followed by the flight number (e.g. SIA123, MAS123, GIA123), when radiotelephony callsign consists of the associated ICAO telephony designator for the aircraft operator followed by the flight number (e.g. SINGAPORE123, MALAYSIAN123, INDONESIA123).

b. The aircraft registration (e.g. N555AB, 9VABC) when the radiotelephony callsign consists of the aircraft registration.

Important: ACID entered should not have any leading zeros unless it is part of the flight number as indicated in Item 7 of the ICAO flight plan. Hyphens, dashes or spaces are NOT to be used.

3.5 VOICE AND CPDLC POSITION REPORTING REQUIREMENTS

3.5.1 There are no voice and CPDLC position reporting requirements for the ADS-B coverage area .

4 OTHER RELEVANT INFORMATION AND PROCEDURES

NIL

ENR 1.8 REGIONAL SUPPLEMENTARY PROCEDURES

1 RVSM PROCEDURES IN THE SINGAPORE FIR AND AIRSPACE WHERE ATS IS PROVIDED BY SINGAPORE (SEE ENR 2.1)

1.1 IMPLEMENTATION OF FLOS (FLIGHT LEVEL ORIENTATION SCHEME) AND FLAS (FLIGHT LEVEL ALLOCATION SCHEME) IN THE WESTERN PACIFIC/SOUTH CHINA SEA AREA

1.1.1 In order to minimise flight level transition requirements for flights entering and leaving the Western Pacific / South China Sea area, the following flight level arrangements will be implemented simultaneously and permanently:

a) a single alternate FLOS (i.e. 'east odd flight levels, west even flight levels') in compliance with the Table "RVSM-FEET" of Appendix 3 of ICAO Annex 2 and in accordance with the FLOS in surrounding areas;

b) special high capacity arrangements for six unidirectional parallel routes (L625, L642, M767, M771, N884 and N892) that involve the use of odd and even flight levels in the same direction of flight; and

c) an associated FLAS agreed between affected ACCs to facilitate ATC 'No-PDC' operations.

1.1.2 Non-RVSM approved aircraft shall fly below RVSM airspace unless prior approval has been obtained from the ACC concerned for such aircraft to operate in RVSM airspace. In the assignment of cruising level in RVSM airspace, RVSM-approved aircraft shall be given priority over non-RVSM approved aircraft.

1.1.3 When an RVSM-approved aircraft reports that it is no longer RVSM-compliant before the transfer of control point, the transferring ACC shall immediately notify the receiving ACC of this fact and provide conventional vertical separation of 2,000ft between this aircraft and the other aircraft.

1.2 RVSM OPERATIONAL APPROVAL AND MONITORING

1.2.1 Operators must obtain airworthiness and operational approval from the State of Registry or State of the Operator, as appropriate, to conduct RVSM operations. The requirement for operators to qualify for RVSM operational approval can be found at:

https://www.caas.gov.sg/legislation-regulations/guidelines-advisory/air-operations

Each aircraft operating in RVSM airspace shall hold a valid RVSM approval. RVSM approval issued for one region will always be valid for RVSM operations in another region provided specific restrictions have not been imposed on the operator by the State of the Operator or State of Registry. The Monitoring Agency for Asia Region (MAAR) monitors operator compliance with State approvals requirements by performing periodic scrutiny checks using Traffic Sample Data and the RVSM approvals record (https://www.aerothai.co.th/maar/approvals.php)

1.2.2 Operators are required to participate in the RVSM aircraft monitoring program. This is an essential element of the RVSM implementation program in that it confirms that the aircraft altitude-keeping performance standard is being met. Monitoring accomplished for other regions can be used to fulfil the monitoring requirements for the Asia/Pacific Region. The information on height-keeping performance monitoring options can be found at:

https://www.aerothai.co.th/maar/

1.3 ACAS II AND TRANSPONDER EQUIPAGE

1.3.1 Aircraft operating in RVSM airspace shall be equipped with an airborne collision avoidance system (ACAS II) and to operate the ACAS system in accordance with the relevant provisions of ICAO Annex 10, Volume IV, Chapter 4.

1.4 IN-FLIGHT PROCEDURES WITHIN RVSM AIRSPACE

1.4.1 Before entering RVSM airspace, the pilot should review the status of required equipment. The following equipment should be operating normally:

a. two primary altimetry systems;
b. one automatic altitude-keeping device; and
c. one altitude-alerting device.

1.4.2 The pilot must notify ATC whenever the aircraft:

a. is no longer RVSM compliant due to equipment failure; or
b. experiences loss of redundancy of altimetry systems; or
c. encounters turbulence that affects the capability to maintain flight level.

See Appendix A for pilot and controller actions in contingency scenarios.

1.4.3 During cleared transition between levels, the aircraft should not overshoot or undershoot the assigned FL by more than 150ft (45m).

1.4.4 Except in an ADS or radar environment, pilots shall report reaching any altitude assigned within RVSM airspace.

1.5 SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES IN OCEANIC AIRSPACE

Introduction

1.5.1 Although all possible contingencies cannot be covered, the procedures in 1.5.4, 1.5.5 and 1.5.6 provide for the more frequent cases such as:

a. the inability to comply with assigned clearance due to meteorological conditions (1.5.6 refers);
b. en-route diversion across the prevailing traffic flow (for example, due to medical emergencies (1.5.4 and 1.5.5 refer)); and
c. the loss of, or significant reduction in, the required navigation capability when operating in an airspace where the navigation performance accuracy is a prerequisite to the safe conduct of flight operations, or pressurization failure (1.5.4 and 1.5.5 refer).

1.5.2 The pilot shall take action as necessary to ensure the safety of the aircraft, and the pilot's judgement shall determine the sequence of actions to be taken, having regard to the prevailing circumstances. Air traffic control shall render all possible assistance.

General Procedures

Note.- Figure 1.5-1 provides an aid for understanding and applying the contingency procedures contained in Section 1.5

1.5.3 If an aircraft is unable to continue the flight in accordance with its ATC clearance, a revised clearance shall be obtained, whenever possible, prior to initiating any action.

1.5.4 If prior clearance cannot be obtained, the following contingency procedures should be employed until a revised clearance is received. In general terms, the aircraft should be flown at an offset level and on an offset track where other aircraft are less likely to be encountered. Specifically, the pilot shall:

a. leave the cleared track or ATS route by initially turning at least 30 degrees to the right or to the left, in order to establish and maintain a parallel, same direction track or ATS route offset 5.0 NM. The direction of the turn should be based on one or more of the following factors:

1) aircraft position relative to any organized track or ATS route system;
2) the direction of flights and flight levels allocated on adjacent tracks;
3) the direction to an alternate airport;
4) any strategic lateral offset being flown; and
5) terrain clearance.

4.2.9 For aircraft going beyond Medan on ATS route L762, FL280 and FL300 may be assigned. Succeeding aircraft on the same route will be cleared to FL280 or FL300 with 10 minutes longitudinal separation provided there is no closing speed with the preceding aircraft. Additional longitudinal separation as appropriate shall be provided by ATC for the faster aircraft following a slower aircraft on the same route.

5 STRATEGIC LATERAL OFFSET PROCEDURES

5.1 INTRODUCTION

5.1.1 Studies and safety analyses conducted by the ICAO Separation and Airspace Safety Panel (SASP) have shown that the application of a strategic lateral offset by aircraft from route centre line would result in an overall increase in safety of operations in remote and oceanic airspace.

5.2 STRATEGIC LATERAL OFFSETS IN EN-ROUTE AIRSPACE

5.2.1 Offsets may only be applied outside surveillance cover in en-route airspace within the Singapore FIR.

5.2.2 Offsets may only be applied by aircraft with automatic offset tracking capability.

5.2.3 The following requirements may apply to the use of the offset:

a. The decision to apply a strategic lateral offset is the responsibility of the flight crew;
b. The offset shall be established at a distance of one or two nautical miles to the right of the centre line relative to the direction of flight. Offsets are not to exceed two nautical miles right of centre line;
c. The strategic lateral offset procedure has been designed to include offsets to mitigate the effects of wake turbulence of preceding aircraft. If wake turbulence needs to be avoided, offsets to the right of the centreline relative to the direction of flight in tenths of a nautical mile up to a maximum of 3.7km (2nm) shall be used.

Pilots may contact other aircraft on the air to air frequency, 123.45MHz, as necessary, to coordinate the best wake turbulence offset option. As noted below, it is not necessary to notify air traffic control of approved offsets;

d. In airspace where the use of lateral offsets has been authorized, ATC clearance is not required for this procedure and pilots are not required to inform ATC that an offset is being applied;
e. Position reports are based on the current ATC clearance and not the exact coordinates of the offset position.

An example of a position report made by a pilot when passing reporting point TODAM while being offset from track is:
“Singapore Radio, Singapore 871, position TODAM 0930 Flight Level 380, estimate.....etc”.

6 WEATHER DEVIATION PROCEDURES IN THE SINGAPORE FIR AND AIRSPACE WHERE ATS IS PROVIDED BY SINGAPORE (SEE ENR 2.1)

6.1 GENERAL

Note.- The following procedures are intended for deviations around adverse meteorological conditions.

6.1.1 Modern ATC radar equipment are normally designed to suppress weather clutter and ATC may not always be aware of its presence.

6.1.2 ATC may pass observed weather information that appears likely to affect the pilot’s flight and advise if a detour will result in the aircraft leaving controlled airspace. The pilot will be responsible for deciding whether to accept a detour into uncontrolled airspace.

6.1.3 If the pilot intends to detour a storm centre observed on his radar display, the pilot shall, obtain clearance from ATC for his proposed action. This is to ensure that separation which ATC may be providing to other aircraft is not prejudiced.

6.1.4 The following procedures are intended to enhance ICAO Regional Supplementary Procedures (DOC 7030). However, it must be recognised that all possible circumstances cannot be covered. The pilot’s judgement shall ultimately determine the sequence of actions taken and ATC shall render all possible assistance.

6.2 OBTAINING ATC PRIORITY WHEN WEATHER DEVIATION IS REQUIRED

6.2.1 When weather deviation is required, the pilot should initiate communications with ATC via voice or CPDLC. A rapid response may be obtained by either:

a. stating “WEATHER DEVIATION REQUIRED” to indicate that priority is desired on the frequency and for ATC response; or
b. requesting a weather deviation using a CPDLC lateral downlink message.

6.2.2 When necessary, the pilot should initiate the communications using the urgency call “PAN PAN” (preferably spoken three times) or by using a CPDLC urgency downlink message to alert all listening parties of a special handling condition which requires ATC priority for issuance of a clearance or assistance.

6.3 ACTIONS TO BE TAKEN WHEN CONTROLLER-PILOT COMMUNICATIONS ARE ESTABLISHED

6.3.1 When two-way pilot-controller communications are in effect, the pilot should notify ATC and request clearance to deviate from track or ATS route, advising, when possible, the extent of the deviation requested. The flight crew will use whatever means are appropriate (i.e. voice and/or CPDLC) to communicate during a weather deviation.

Note.- Pilots are advised to contact ATC as soon as possible with requests for clearance in order to provide adequate time for the request to be assessed and acted upon.

6.3.2 After communicating with ATC, ATC will take one of the following actions:

a. if there is no conflicting traffic in the lateral dimension, ATC shall issue clearance to deviate from track;
b. if there is conflicting traffic in the lateral dimension, ATC shall separate aircraft by establishing vertical separation and issue a clearance to deviate from track;
c. if there is conflicting traffic in the lateral dimension, and ATC is unable to establish vertical separation, ATC shall advise the pilot and provide information on all other aircraft with which the aircraft could potentially conflict.

6.3.3 The pilot shall either:

a. comply with the ATC clearance issued; or
b. if ATC is unable to issue a revised clearance, the pilot shall evaluate the circumstances of the situation and advise ATC of intentions before executing the procedures detailed in paragraph 6.4. ATC will issue essential traffic information to all affected aircraft.

ENR 1.9 AIR TRAFFIC FLOW MANAGEMENT (ATFM)

1 AIR TRAFFIC FLOW MANAGEMENT (ATFM)

1.1 ATFM is a service to complement the safe, orderly and efficient delivery of Air Traffic Services (ATS) by regulating air traffic flow to match the prevailing capacity at a given airport or airspace. Through ATFM, airspace users (AUs) and ATS units (ATSUs) can be made aware of predicted delays so that timely adjustment to operations and flight schedules could be made accordingly. ATFM measure such as Ground Delay Programme (GDP), Minimum Departure Interval (MDI) and Miles- in-Trail (MIT) are some of the methods to achieve the objectives of ATFM as defined in ICAO's Manual on Collaborative ATFM (Doc 9971).

1.2 For Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1), ATFM services are provided by Civil Aviation Authority of Singapore (CAAS) from the Singapore ATFM Unit (ATFMU) operating on a 24-hour basis. The services comprise the planning and implementation of ATFM measures to balance demand and capacity. The review of the effectiveness of ATFM measures are carried out through the conduct of post operation analysis. The implementation of ATFM measures will be coordinated with AUs and ATSUs through Collaborative Decision Making (CDM) processes and agreed operating procedures.

2 ATFM OPERATIONS FOR FLIGHTS ARRIVING AT SINGAPORE CHANGI AIRPORT

2.1 Where necessary, ATFM measures will be applied for flights scheduled to arrive at Singapore Changi Airport (WSSS).

2.2 Flights departing from the following airports may be subjected to ATFM measures:

States/Adminstrations	Airport
Cambodia	VDPP, VDSA, VDSV
China	ZGGG, ZGSZ, ZJHK, ZJSY
Hong Kong	VHHH, VMMC
Indonesia	WIII, WADD, WARR
Malaysia	WBGG, WBKK, WMKI, WMKJ, WMKK, WMKL, WMKP, WMSA
Myanmar	VYMD, VYNT, VYYY
Philippines	RPLL, RPLC, RPVM, RPSP
Republic of Korea	RKSI, RKSS, RKPK, RKPC, RKTN, RKNW
Thailand	VTBS, VTSP, VTBD, VTBU, VTCC, VTCT, VTSB, VTSG, VTSM, VTSS, VTUD
Vietnam	VVTS, VVNB, VVDN, VVCI, VVCR, VVPQ, VVVD, VVVH, VVPB, VVCT, VVDL

2.3 When ATFM measures are applied, the Singapore ATFMU will assign Calculated Take-Off Times (CTOTs) to flights departing from the airports listed in paragraph 2.2 planning to arrive into Singapore Changi Airport.

2.4 AUs and ATSUs are advised to refer to the Air Traffic Flow Management (ATFM) Portal to access CTOTs and/or other pertinent ATFM information via the Civil Aviation Authority Singapore (CAAS) Webpage, link provided: http://www.caas.gov.sg/e-services/air-traffic-flow-management

2.5 Compliance to CTOT during the ATFM operation is important, it contributes to the realisation of the ATFM plan. It would assist in the reduction of the need for tactical airborne delay, promoting a safer and more efficient operating environment for AOs and AUs.

2.6 All AUs planning to arrive into WSSS shall:

a. file and submit FPLs at least 3 hours before the Estimated Off Block Time (EOBT);
b. transmit the appropriate ATS messages (CHG / DLA) when the EOBT changes by more than 15 minutes; and
c. transmit CNL message if the flight is cancelled after the submission of FPL.

2.7 FPLs and ATS messages shall be addressed to WSJCZQZX.

3 ATFM OPERATIONS FOR FLIGHTS PLANNING TO OPERATE WITHIN THE SINGAPORE FIR AND AIRSPACE WHERE ATS IS PROVIDED BY SINGAPORE (SEE ENR 2.1)

3.1 The Singapore ATFMU may implement ATFM measures to facilitate ATC of flow restrictions originated by downstream ATSUs, with the aim to provide a higher level of predictability for AUs and affected upstream ATSUs when operating in the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1). For example, flow restriction on a given ATS

route in a form of Minutes-in-trail MINIT at downstream segments would be converted into CTOT, and/or Calculated Time Over (CTO) at a given waypoint within the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1).

3.2 Procedures for flight plan submission for such ATFM facilitation would be coordinated tactically by the Singapore ATFMU with AUs and affected upstream ATSUs. The transmit of the appropriate ATS messages would take reference from para 2.6 in the above.

Note: In general, Singapore ATFMU would request for FPL to be filed and submitted within 1 hour from the notification of the activation of ATFM measure.

3.3 FPLs and ATS messages should be addressed to WSJCZQZX.

4 SINGAPORE ATFMU CONTACT INFORMATION AND WEB CONFERENCE

4.1 When ATFM measure are implemented, Singapore ATFMU will open a CDM channel for AUs and affected ATSUs through an active web conferencing facilities and ATFM helpdesk thereafter to facilitate operational queries from AUs relating to the ATFM measure.

4.2 The contact details of the Singapore ATFMU are as follows:
Email: CAAS_ATFMU@caas.gov.sg
Phone: (+65) 62414143, (+65) 62414142
Fax: (+65) 62414034

5 BAY OF BENGAL COOPERATIVE ATFM (BOBCAT)

5.1 INTRODUCTION

5.1.1 BOBCAT service is provided by Aeronautical Radio of Thailand LTD (AEROTHAI) from the Bangkok Air Traffic Flow Management Unit (ATFMU) for westbound flights intending to transit Kabul FIR between 2000 UTC and 2359 UTC daily. The service provided includes calculation, promulgation, and management of mandatory Calculated Take-Off Time (CTOT) and flight level, ATS route, and Calculated Time Over (CTO) at entry waypoint for entry into Kabul FIR for each affected flight.

5.1.2 The Bangkok ATFMU operates on a 24-hour basis and is responsible for westbound flights entering the Kabul FIR at specified times, flight levels and ATS routes in accordance with paragraph 5.2. The objectives of this ATFM service are to:

a. Reduce ground and en-route delays;
b. Maximise capacity and optimize the flow of air traffic through Kabul FIR;
c. Provide an informed choice of routing and flight level selection;
d. Alleviate unplanned in-flight re-routing and technical stops; and
e. Assist regional Air Navigation Service Providers (ANSPs) in planning for and managing workload in handling increased air traffic flow through Kabul FIR.

5.1.3 Bangkok ATFMU utilises the automated, web-based BOBCAT in providing ATFM service in Kabul FIR. These responsibilities will be managed in coordination with airspace users and Singapore ATC in the Singapore FIR and airspace where ATS is provided by Singapore (see ENR 2.1).

5.2 ATFM AFFECTED ATS ROUTES, FLIGHT LEVELS AND APPLICABLE HOURS

5.2.1 All westbound flights intending to enter Kabul FIR between 2000 UTC and 2359 UTC daily on ATS routes and flight levels specified in the Table below shall comply with the BOBCAT procedures. This includes a mandatory requirement for all flights to obtain a specific ATFM slot allocation - CTOT, CTO at Kabul FIR entry waypoint, allocated flight level and allocated ATS route from Bangkok ATFMU for entry into Kabul FIR.

Routing through the Kabul FIR	Metering Waypoint	Flight Level
M875 – TAPIS – L509	LAJAK	FL300, FL320, FL340, FL360, FL380, FL400
N644	DOBAT	FL320, FL340, FL360, FL380, FL400
L750	BIROS	FL320, FL340, FL360, FL380, FL400
P628	ASLUM	FL320, FL340, FL360, FL380, FL400
UL333	SERKA	FL320, FL340, FL360, FL380, FL400

ENR 2 AIR TRAFFIC SERVICES AIRSPACE

ENR 2.1 FIR, UIR, TMA

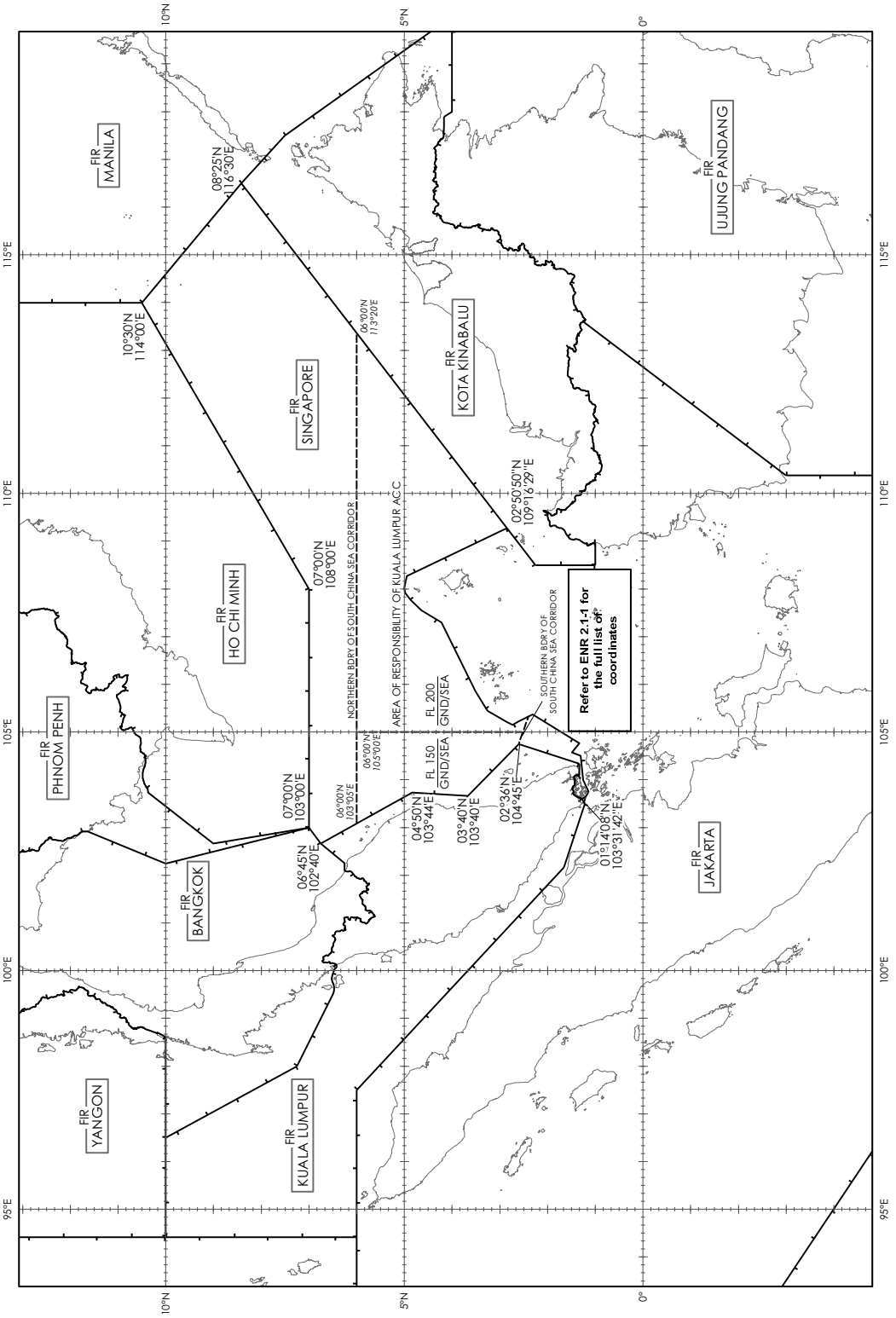
Name Lateral limits Upper limit/Lower limit Class of airspace	*Unit providing service*	*Call sign Languages Area and conditions of use Hr of ser*	*Frequency /Purpose*	*Remarks*
1	2	3	4	5
SINGAPORE FIR 082500N 1163000E - 025050N 1091629E - 045700N 1081619E - 050012N 1080132E - 045904N 1075525E - 045203N 1074625E - 043820N 1073315E - 041312N 1071743E - 033045N 1055130E - 031727N 1052959E - 031453N 1052619E - 025010N 1051210E - 024348N 1050854E - 023641N 1051311E - 021838N 1052205E - 011947N 1044606E - 012921N 1043441E - 011800N 1043000E - 011500N 1040000E - 010800N 1034500E - 011046N 1034015E - 011200N 1033900E - 011408N 1033142E - 011700N 1033600E thence east along the national boundary of Singapore/Malaysia, thence along 012000N to 012000N 1042000E - 023600N 1044500E - 034000N 1034000E - 045000N 1034400E - 064500N 1024000E - 070000N 1030000E - 070000N 1080000E - 103000N 1140000E - 082500N 1163000E **UNL** **SFC**	SINGAPORE ACC	SINGAPORE RADAR English H24	255.4MHz Primary 123.7MHz 133.25MHz 134.4MHz 133.8MHz 134.2 MHZ 134.9 MHZ 134.7MHz 135.05 MHZ Secondary 127.3MHz 135.8MHz 128.1MHz 133.35MHz 134.35 MHZ 134.15kHZ 134.95 MHZ SEA 1 6556kHz 11297kHz SEA 2 5655kHz 8942kHz 11396kHz SEA 3 6556kHz	The responsibility for providing air traffic services to flights within the following portions of the Singapore FIR is vested in the Kuala Lumpur ACC: The airspace between a line from 023600N 1044500E to 022715N 1051750E - 023641N 1051311E - 024348N 1050854E - 025010N 1051210E - 031453N 1052619E - 031727N 1052959E - 033045N 1055130E - 041312N 1071743E - 043820N 1073315E - 045203N 1074625E - 045904N 1075525E - 050012N 1080132E - 045700N 1081619E - 025050N 1091629E, in the south, and a line along 060000N in the north, and from surface level to FL150 west of longitude 105E and from surface level to FL200 east of longitude 105E. SEA 1, SEA 2, SEA 3: SSB Suppressed Carriers.
		SINGAPORE CONTROL SOUTH CHINA SEA English H24	AFN LOGON WSJC	Suitably equipped aircraft operating outside radar cover and not in ADS-B exclusive airspace within the Singapore FIR should log on to Singapore's AFN LOGON address at least 10 minutes prior to entering the above-mentioned airspace in Singapore FIR. Area Navigation (RNAV) routes suitable for ADS-C and / or CPDLC logon are described in ENR 3.2.

Name *Lateral limits* *Upper limit/Lower limit* *Class of airspace*	*Unit providing service*	*Call sign* *Languages* *Area and conditions of use* *Hr of ser*	*Frequency /Purpose*	*Remarks*
1	2	3	4	5
AREAS WITHIN JAKARTA FIR WHERE PROVISION OF ATS IS DELEGATED TO SINGAPORE				
The area bounded by 031727N 1052959E - 012450N 1061648E - 001030N 1045656E - 000000N 1050340E - 000000N 1044330E thence around the arc of a circle radius 90 NM centred on 011324N 1035124E to 013430N 1022353E - 011300N 1033000E - 011408N 1033142E - 011200N 1033900E - 011046N 1034015E - 010800N 1034500E - 011500N 1040000E - 011800N 1043000E - 012921N 1043441E - 011947N 1044606E - 021838N 1052205E - 023641N 1051311E - 024348N 1050854E - 025010N 1051210E - 031453N 1052619E - 031727N 1052959E Excluding the Tanjungpinang Terminal Control Area and Control Zone FL370 **SFC**	SINGAPORE ACC	SINGAPORE RADAR English H24	255.4MHz Primary 133.25MHz 134.4MHz 134.2MHz Secondary 135.8MHz 128.1MHz 133.35 MHz	

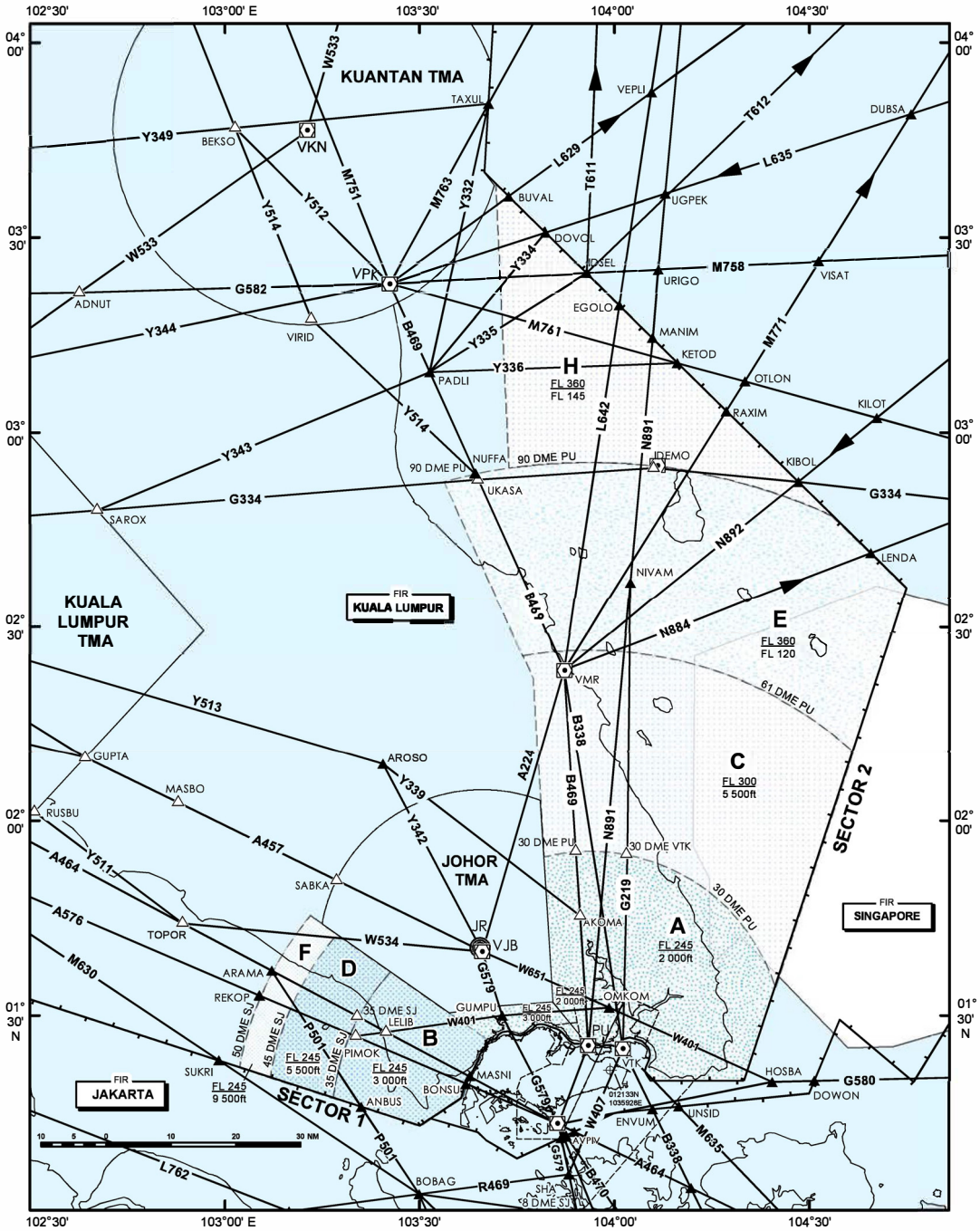
Name *Lateral limits* *Upper limit/Lower limit* *Class of airspace*	*Unit providing service*	*Call sign* *Languages* *Area and conditions of use* *Hr of ser*	*Frequency /Purpose*	*Remarks*
1	2	3	4	5
AREAS WITHIN THE KUALA LUMPUR FIR FOR WHICH SINGAPORE ACC IS RESPONSIBLE FOR PROVIDING ATS **SECTOR 1:**				
That airspace contained within coordinates 011300N 1033000E - 012203N 1030209E thence along an arc radius 50 DME SJ to 014529N 1031305E - 014225N 1031728E, thence along the Johor TMA western boundary to 013022N 1033437E - 012600N 1034055E, thence along the Peninsular Malaysia and Singapore international boundary to 011700N 1033600E - 011300N 1033000E. The airspace herein is designated as follows: a. **AREA B** (SJ DVOR/DME - 35 DME SJ) - 3 000ft to FL245 b. **AREA D** (35 DME SJ - 45 DME SJ) - 5 500ft to FL245 c. **AREA F** (45 DME SJ - 50 DME SJ) - 9 500ft to FL245	SINGAPORE ACC	SINGAPORE RADAR English H24	Primary 133.25MHz Secondary 135.8MHz	Controlling Authority: Johor APP for airspaces below Sectors 1 and 2, Airway W401 and south of VMR DVOR. Note: *In the event an aircraft in the areas is forced to make an emergency descent which will penetrate Malaysian airspace, the pilot shall advise Singapore ATC immediately.*
SECTOR 2: That airspace contained within coordinates 013206N 1035031E - 022205N 1034724E - 025234N 1033340E - 025432N 1034341E - 033822N 1034139E - 023600N 1044500E - 012000N 1042000E - 012000N 1040528E thence along the Peninsular Malaysia and Singapore international boundary to 012600N 1034055E to 013022N 1033437E - 013130N 1034236E to 013206N 1035031E. The airspace herein is designated as follows: a. **AREA A** (PU DVOR/DME - 30 DME PU excluding the northern portion of Changi CTR) - 2 000FT to FL245 b. **AREA C** (30 DME PU - 61 DME PU) - 5 500FT to FL300 c. **AREA E** (61 DME PU - 90 DME PU) - FL120 to FL360 d. **AREA H** (from 025432N 1034341E thence along the 90 DME PU arc to the FIR boundary (024712N 1043337E) thence to 033822N 1034139E - 025432N 1034341E) - FL145 to FL360	SINGAPORE ACC	SINGAPORE RADAR English H24	Primary 123.7MHz 133.8MHz Secondary 127.3MHz	
ATS ROUTES W401 and G579 a. W401 [Airspace between OMKOM and PU radial 324 from 2,000ft to FL245 and PU radial 324 to PIMOK (excluding WMP228) from 3,000ft to FL245]. b. G579 from 2000ft to FL460.	SINGAPORE ACC	SINGAPORE RADAR English H24		

Name Lateral limits Upper limit/Lower limit Class of airspace	*Unit providing service*	*Call sign Languages Area and conditions of use Hr of ser*	*Frequency /Purpose*	*Remarks*
1	2	3	4	5
SINGAPORE /JOHOR AIRSPACE COMPLEX All controlled airspace within 022600N 1025605E - 022600N 1043400E - 004300N 1043400E - 004300N 1025605E. *FL250 2000ft ALT	SINGAPORE ACC	SINGAPORE RADAR English H24	Primary 123.7MHz 133.8MHz Secondary 127.3MHz	*Upper limit FL450 from HOSBA [34 DME SJ R-079 (24 DME VTK R-103)] Lower limit varies from 2 000ft to 3 500ft ALT.
ALL AIRWAYS WITHIN THE SINGAPORE FIR, KUALA LUMPUR FIR AND ITS TRANSFER AREAS AND KOTA KINABALU FIR (see subsection ENR 3.1)	SINGAPORE ACC	SINGAPORE RADAR English H24	Primary 133.25MHz 123.7MHz 133.8MHz Secondary 135.8MHz 127.3MHz	Airspaces within the Kuala Lumpur FIR under the control of Singapore ACC are depicted in diagrams in AIP pages: ENR 2.1-11 for AWY A464 ENR 2.1-13 for AWY B469
TANJUNGPINANG TMA 002448N 1043700E follow the circle radius 30NM from 005511N 1043134E anti-clockwise until 010342N 1050018E 005612N 1053200E thence along the circle with radius 60NM from 005511N 1043134E clockwise until 000224N 1050206E 002448N 1043700E 10 000ft 3000 FT	TANJUNGPINANG APPROACH CONTROL OFFICE (APP)	TANJUNGPINANG RADAR English H24	Primary 130.2MHz Secondary 119.35MHz	
TANJUNGPINANG NORTH CONTROL ZONE (CTR) 011533N 1040852E - 011638N 1041620E - 011305N 1042029E - 010942N 1043500E - thence along the circle radius 27 NM from BTM VOR/DME clockwise until 004236N 1041654E - 005315N 1040335E - 010018N 1035530E - 011553N 1040852E 3 000ft GND/MSL				
TANJUNGPINANG SOUTH CONTROL ZONE (CTR) 004236N 1041654E follow the circle radius 27 NM from BTM VOR/DME anti-clockwise until 010942N 1043500E - 010342N 1050018E thence along the circle radius 30 NM from 0055.0N 10432.0E clockwise until 002448N 1043700E - 004236N 1041654E 6 000ft GND/MSL				

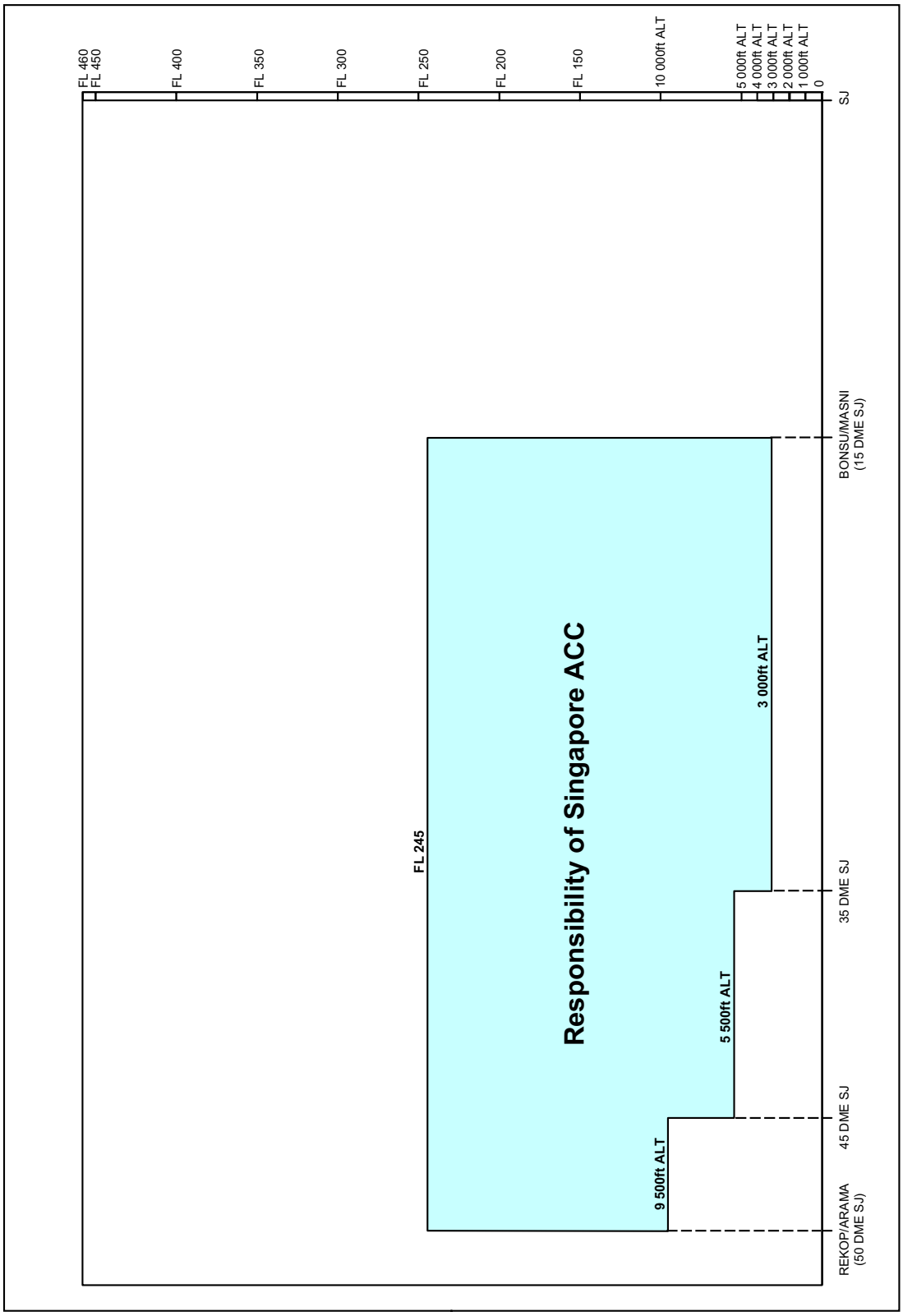
SINGAPORE AND ADJACENT FLIGHT INFORMATION REGIONS



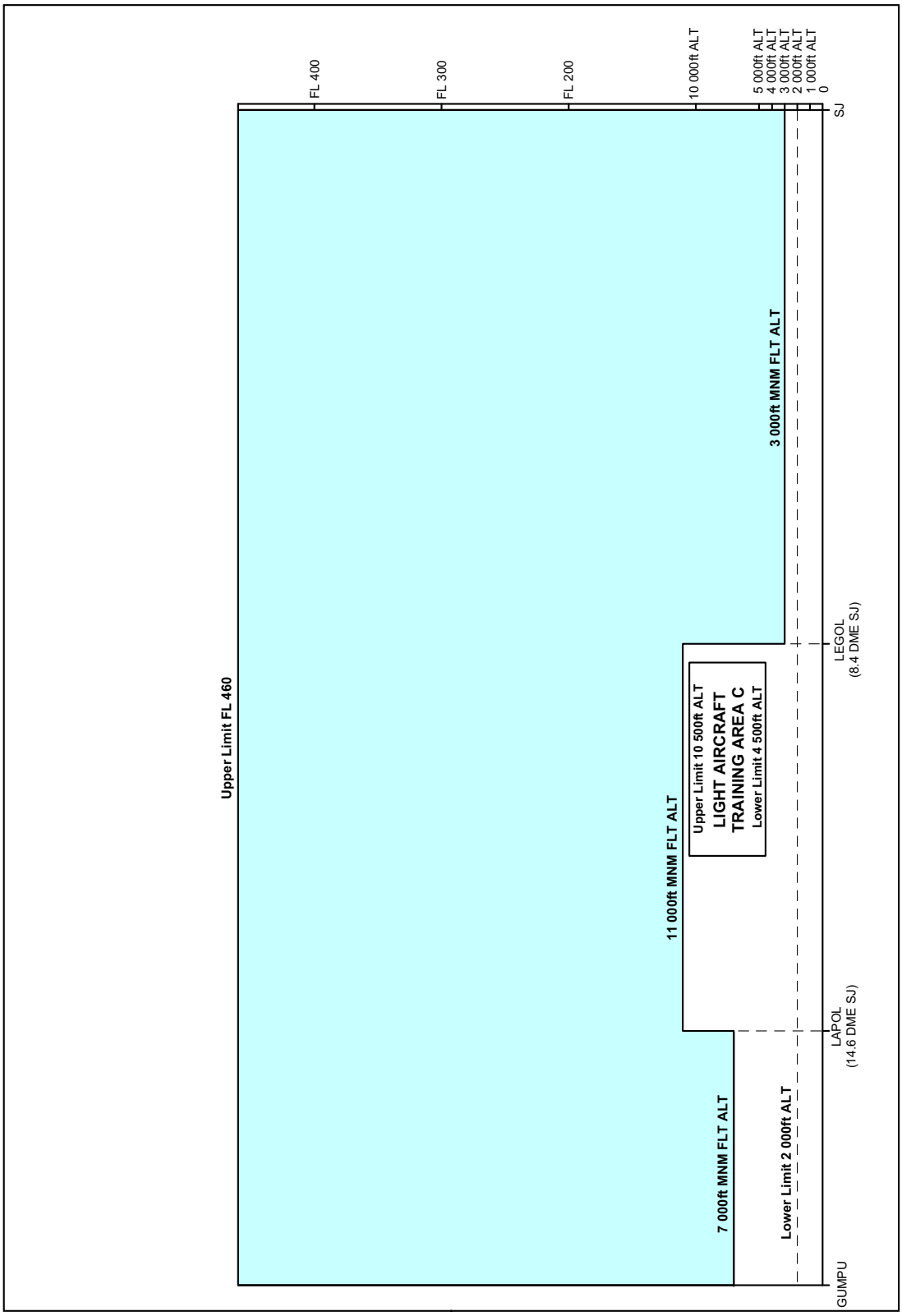
AIRSPACE DIVISION KUALA LUMPUR/SINGAPORE AREAS CONTROL CENTRES



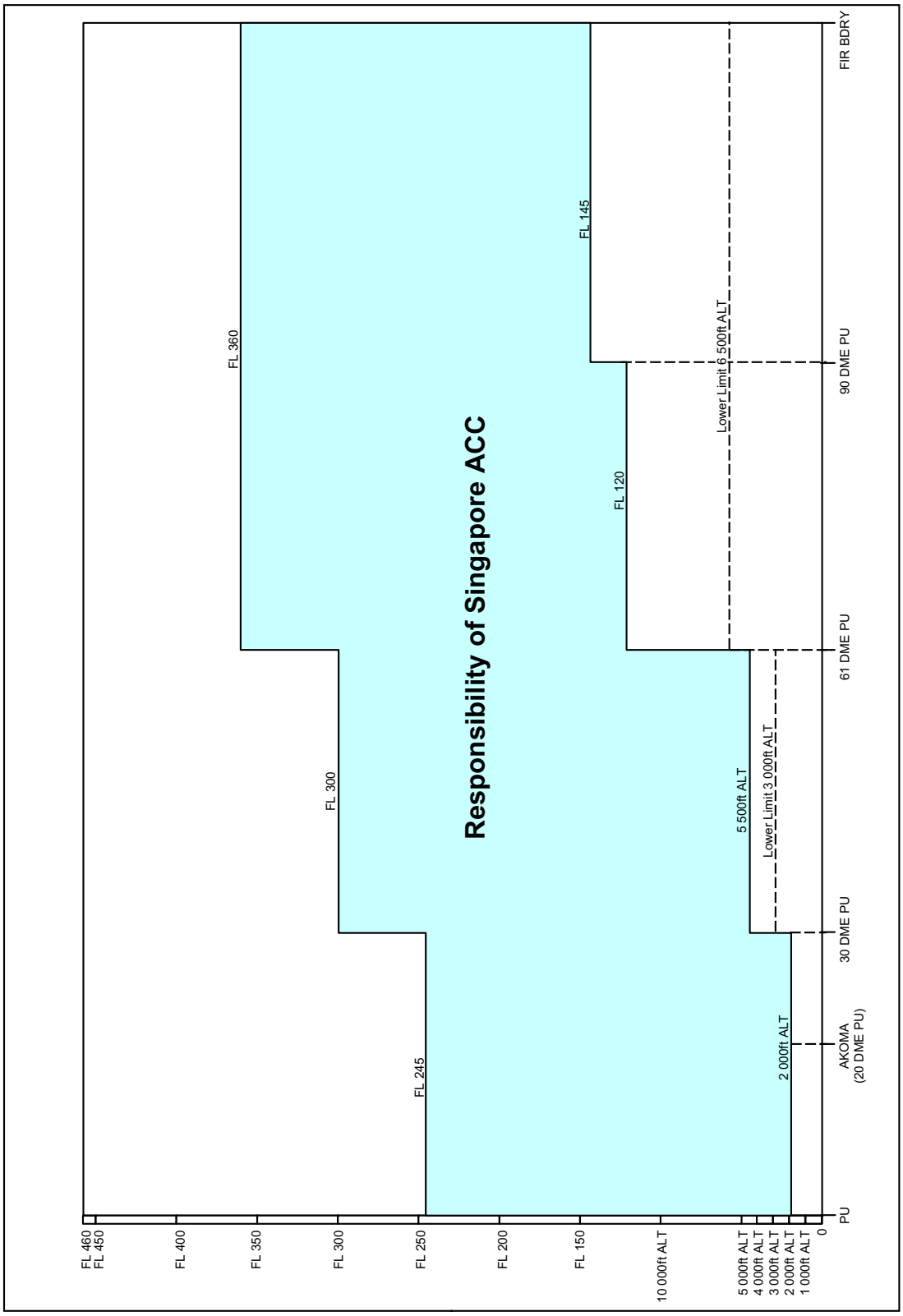
LONGITUDINAL CROSS-SECTION OF SECTOR 1
SJ-REKOP/ARAMA (50 DME SJ)

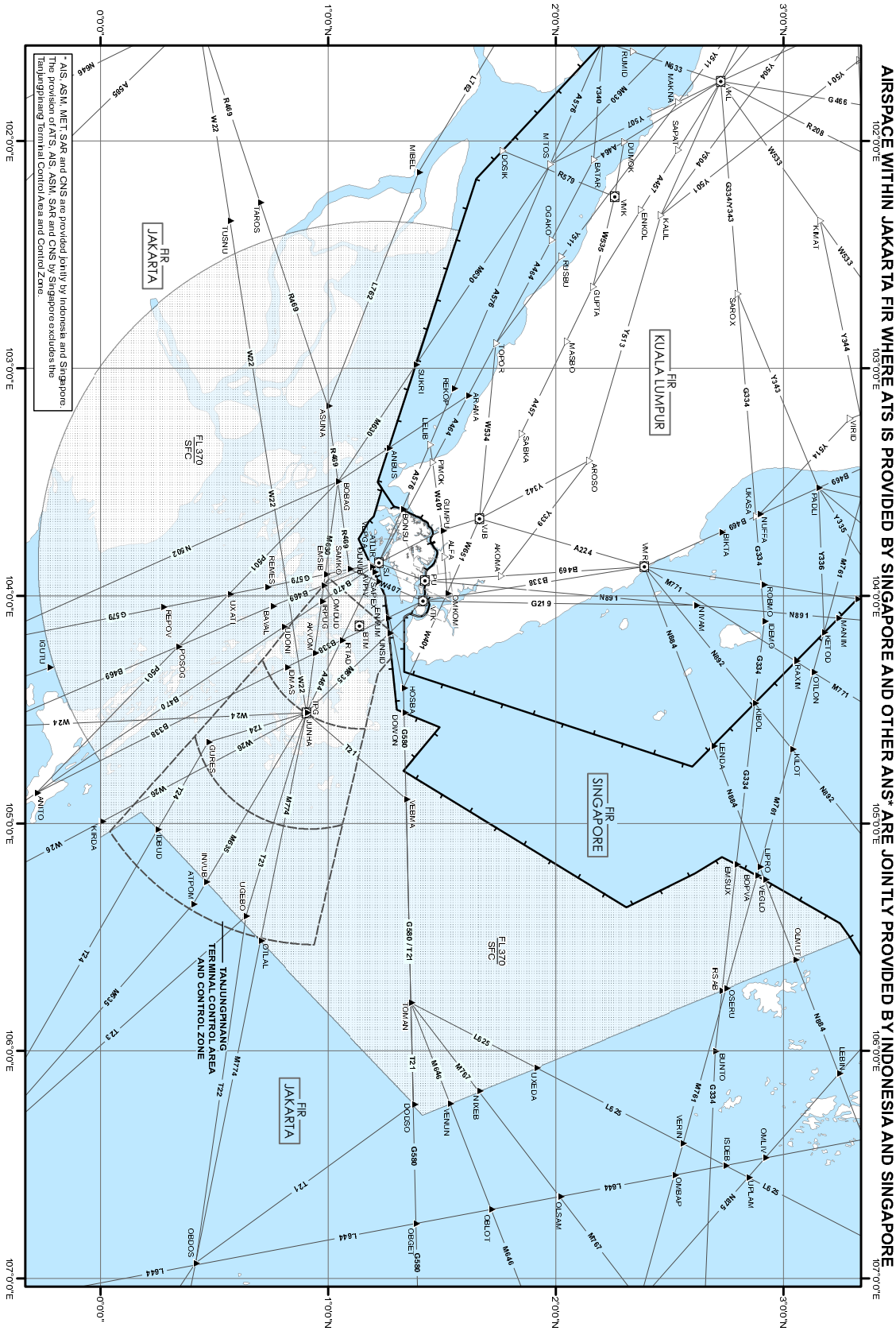


LONGITUDINAL CROSS-SECTION OF G579 FROM GUMPU TO SJ



LONGITUDINAL CROSS-SECTION OF SECTOR 2
PU-SINGAPORE/LUMPUR FIR BOUNDARY





ENR 3.2 AREA NAVIGATION ROUTES

Route Designator {RNP Type}		*[Route Usage Notes]*					
	Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}		*Track MAG* ↓/↑	*Dist NM*	*Upper limit / Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		**2**	**3**	**4**	**5**	**6**	**7**
L517		*Route availability:* (1) H24					
▲	TERIX	041521N 1093456E					
			92.0NM	FL 460 / FL 240		Even(1)	[Class A]
▲	GULIB (WSJC/WBFC FIR BDRY)	041714N 1110633E					(2)

Route remarks:
ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover and not in the ADS-B Out exclusive airspace within the Singapore FIR.
Singapore ACC FREQ
P135.05MHz S134.95MHz

Point/Segment Remarks:
(2) VMI 269°
173NM

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓ – ↑	*Dist NM*	*Upper limit* / *Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
L625	*Route availability:* (1) H24					
▲ AKMON	081254N 1101306E					
(10)	- / 035°	236.1NM	FL 460 / FL 135			[Class A](2)(3)
▲ GUTUP (WSJC/WIIF FIR BDRY)	045911N 1075603E					
(10)	- / 035°	104.4NM	FL 600 / FL 135			[Class A] [Class B](4)
▲ LUSMO	033341N 1065534E					
(10)	- / 027°	48.2NM	FL 600 / FL 135			[Class A] [Class B](4)
▲ UPLAM	025043N 1063319E					
(10)	- / 027°	6.8NM	FL 600 / FL 135			[Class A] [Class B](4)
▲ ISDEB	024440N 1063011E					
(10)	- / 027°	12.5NM	FL 600 / FL 135			[Class A] [Class B](4)
▲ VERIN	023332N 1062425E					
(10)	- / 027°	43.4NM	FL 600 / FL 245			[Class A](4)
▲ UXEDA (Delegated airspace BDRY)	015449N 1060423E					
(10)	- / 027°	37.1NM	FL 600 / FL 245			[Class A](5)
▲ TOMAN	012147N 1054717E					

Route remarks:
Uni-directional for north-east bound flights from TOMAN to AKMON. No PDC Flight Levels FL310, FL320, FL350, FL360, FL390, FL400 applicable. Other levels available with prior approval.
Flights above FL370 from TOMAN to UXEDA, see AIP Indonesia ENR2.1.

Point/Segment Remarks:
(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between GUTUP and AKMON) and not in the ADS-B Out exclusive airspace within the Singapore FIR.
(3) Segment from GUTUP to 50NM before AKMON use:
P135.05 MHz
S134.95 MHz
(4) Segment from UXEDA to GUTUP to contact Jakarta ACC.
(5) Segment from TOMAN to UXEDA use:
P134.2 MHz
S133.35 MHz

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓/↑	*Dist NM*	*Upper limit / Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
L642	*Route availability:* (1) H24					
▲ ESPOB (VVHM/WSJC FIR BDRY)	070000N 1053318E					
(10)		149.2NM	FL 460 / FL 135			[Class A](2)(3)(4)
▲ ENREP	045224N 1041442E					(7)
(10)		60.4NM	FL 460 / FL 135	Odd(1)	Even(1)	[Class A](5)
▲ VEPLI	035223N 1040542E					(8)
(10)		33.0NM	FL 460 / FL 135	Odd(1)	Even(1)	[Class A](5)
▲ EGOLO (WSJC/WMFC FIR BDRY)	031934N 1040047E					(9)
(10)		25.1NM	FL 460 / FL 135	Odd(1)	Even(1)	[Class A](6)
▲ ROBMO	025440N 1035700E					(10)
(10)		31.6NM	FL 460 / FL 135	Odd(1)	Even(1)	[Class A](6)
▲ MERSING DVOR/DME (VMR)	022318N 1035218E					

Route remarks:
Lateral Limits:
10NM either side of line joining VMR DVOR/DME to EGOLO and 25NM either side of line joining EGOLO to ESPOB.
Bi-directional between VMR and ENREP.
Flight planning for Direct Routing Operations (DRO):
Arriving aircraft to Singapore Changi Airport operating at FL290 to FL460 (inclusive) and entering Singapore FIR via ESPOB should flight plan using the direct route ESPOB DCT ELALO.
All other aircraft operating at FL290 to FL460 (inclusive) and entering Singapore FIR via ESPOB should flight plan using the direct route ESPOB DCT EGOLO.

Point/Segment Remarks:
(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between ESPOB and ENREP) and not in the ADS-B Out exclusive airspace within Singapore FIR.
(3) Uni-directional for southbound flights from ESPOB to ENREP. No PDC Flight Levels FL310, FL320, FL350, FL360, FL390, FL400 applicable. Other levels available with prior approval.
(4) Segment from ESPOB to ENREP use:
P134.9 MHz
S134.35 MHz
(5) Segment from ENREP to EGOLO use:
P123.7 MHz
S127.3 MHz
(6) Segment from EGOLO to VMR use:
P133.8 MHz
S127.3 MHz
(7) VMR 008°
150.0NM
(8) VMR 008°
89.7NM
(9) VMR 008°
56.6NM
(10) VMR 008°
31.6NM

Route Designator {RNP Type}		*[Route Usage Notes]*					
	Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}		*Track MAG* ↓/↑	*Dist NM*	*Upper limit / Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		**2**	**3**	**4**	**5**	**6**	**7**
L644		*Route availability:* (1) H24					
▲	DUDIS (WSJC/VVHM FIR BDRY)	070000N 1064836E					
(10)		192° / -	165.8NM	FL 460 / FL 240	Odd(1)		[Class A](2)(3)
▲	MABLI	041717N 1061247E					
(10)		169° / -	33.4NM	FL 460 / FL 240	Odd(1)		[Class A](4)
▲	LIGVU (WSJC/WIIF FIR BDRY)	034417N 1061859E					

Route remarks:
Flight Planning Instructions for Direct Routing Operations (DRO):
All aircraft operating at FL290 to FL460 (inclusive) and entering Singapore FIR via DUDIS should flight plan using the direct route DUDIS DCT LIGVU.

Point/Segment Remarks:
(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between DUDIS and MABLI) and not in the ADS-B Out exclusive airspace within Singapore FIR.
(3) Segment from DUDIS to MABLI use:
P134.9 MHz
S134.35 MHz
(4) Segment from MABLI to LIGVU use:
P134.7 MHz
S134.15 MHz

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓/↑	*Dist NM*	*Upper limit / Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
L649	*Route availability:* (1) H24					
▲ LAXOR (WSJC/RPHI FIR BDRY)	094937N 1144829E					
(10)		98.0NM	FL 460 / FL 240		Even(1)	[Class A]
▲ URKET (WSJC/WBFC FIR BDRY)	081130N 1145000E					
(10)		62.0NM	FL 460 / FL 240		Even(1)	[Class A]
▲ DAKIX (WBFC/WSJC FIR BDRY)	070854N 1145054E					(2)

Route remarks:
Available only for flights departing from Brunei (WBSB), Labuan (WBKL) and Miri (WBGR) to Hong Kong (VHHH) only.
No-PDC Flight Levels FL300 and FL380 applicable.
ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover and not in the ADS-B Out exclusive airspace within the Singapore FIR.
Singapore ACC FREQ:
P135.05 MHz S134.95 MHz

Point/Segment Remarks:
(2) BRU 359°
136NM

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓/↑	*Dist NM*	*Upper limit / Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
L762	*Route availability:* (1) H24					
▲ ASUNA	005948N 1030954E					
(10)	291° / 111°	66.2NM	FL 600 / 9500 FT ALT	Even(1)	Odd(1)	[Class A - ABV FL150] [Class B - BLW FL150]
▲ MIBEL	012351N 1020816E					

Route remarks:
Singapore ACC FREQ:
P133.25MHz S135.8MHz
Flight Planning Instructions:
Westbound - Aircraft originating only from airports within Singapore, Batam, Tanjungpinang and Johor to Medan and destinations beyond Jakarta FIR.
Eastbound - Aircraft to destinations within Singapore, Batam, Tanjungpinang and Johor only.
Flights above FL370 between ASUNA and MIBEL, see AIP Indonesia ENR 2.1.

Point/Segment Remarks:
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Route Designator {RNP Type}		*[Route Usage Notes]*					
	Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}		*Track MAG* ↓/↑	*Dist NM*	*Upper limit / Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		**2**	**3**	**4**	**5**	**6**	**7**
M753		*Route availability:* (1) H24					
▲	IPRIX (VVHM/WSJC FIR BDRY)	070000N 1040754E					
			127.2NM	FL 460 / FL 155	Odd(1)	Even(1)	[Class A]
▲	ENREP	045224N 1041442E					

Route remarks:
Singapore ACC FREQ:
P134.9 MHz
S134.35 MHz
ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover and not in the ADS-B Out exclusive airspace within the Singapore FIR.
Flight planning for Direct Routing Operations (DRO):
Departing aircraft from Singapore operating at FL290 to FL460 (inclusive) and exiting Singapore FIR via IPRIX should flight plan using the direct route EGOLO DCT IPRIX.
All other aircraft operating at FL290 to FL460 (inclusive) and entering or exiting Singapore FIR via L642 ENREP M753 IPRIX should flight plan using the direct route EGOLO DCT IPRIX or its reciprocal track.
Lateral Limits:
25NM either side of line joining ENREP to IPRIX.

Point/Segment Remarks:
-

Route Designator {RNP Type}		*[Route Usage Notes]*					
	Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}		*Track MAG* ↓ / ↑	*Dist NM*	*Upper limit* / *Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		2	3	4	5	6	7
M754		*Route availability:* (1) H24					
▲	VINIK (WSJC/RPHI FIR BDRY)	083830N 1161348E					
			37.9NM	FL 460 / FL 135	Even(1)	Odd(1)	[Class A–ABV FL150 Class B-BLW FL150](2)
▲	SUMLA (WSJC/WMFC FIR BDRY)	080242N 1160054E					

Route remarks:
Lateral Limits:
10NM either side of line joining SUMLA to VINIK.
Portion of M754 within the Singapore FIR has been delegated to Kinabalu ACC for provision of ATS.
Kinabalu ACC FREQ:
126.1 MHz

Point/Segment Remarks:
(2) BRU 019°
238.9NM

Route Designator {RNP Type}		*[Route Usage Notes]*					
	Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}		*Track MAG* ↓/↑	*Dist NM*	*Upper limit / Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		2	3	4	5	6	7
M758		*Route availability:* (1) H24					
▲	PEKAN DVOR/DME (VPK)	032259N 1032524E					
		087°/267°	30.4NM	FL 460/FL 240	Odd(1)	Even(1)	[Class A](2)
▲	IDSEL (WMFC/WSJC FIR BDRY)	032432N 1035544E					
		087°/267°	11.1NM	FL 460/FL 240	Odd(1)	Even(1)	[Class A](3)
▲	URIGO	032505N 1040647E					
		087°/267°	24.8NM	FL 460/FL 240	Odd(1)	Even(1)	[Class A](3)
▲	VISAT	032620N 1043134E					
		087°/267°	41.1NM	FL 460/FL 240	Odd(1)	Even(1)	[Class A](3)
▲	MABAL	032826N 1051236E					
		087°/267°	35.7NM	FL 460/FL 240	Odd(1)	Even(1)	[Class A](3)
▲	ELGOR	033014N 1054818E					
		087°/267°	2.6NM	FL 460/FL 240	Odd(1)	Even(1)	[Class A](3)
△	UPVUN (WSJC/WIIF FIR BDRY)	033022N 1055053E					
		087°/267°	30.5NM	FL 600/FL 245	Odd(1)	Even(1)	[Class A](3)(4)
▲	OPULA	033155N 1062118E					
		087°/267°	34.3NM	FL 600/FL 245	Odd(1)	Even(1)	[Class A](4)
▲	LUSMO	033341N 1065534E					
		075°/255°	110.7NM	FL 600/FL 245	Odd(1)	Even(1)	[Class A](4)
▲	GULGU (WSJC/WIIF FIR BDRY)	040141N 1084242E					
		075°/255°	53.9NM	FL 460/FL 240	Odd(1)	Even(1)	[Class A](5)(6)
▲	TERIX	041521N 1093456E					
		075°/255°	140.5NM	FL 460/FL 240	Odd(1)	Even(1)	[Class A](5)(6)
▲	OLKIT (WSJC/WBFC FIR BDRY)	045010N 1115118E					

Route Designator {RNP Type}	***[Route Usage Notes]***					
Significant Point Name	***Significant Point Coordinates***					***Remarks***
{RNP Type}	***Track MAG*** ↓/↑	***Dist NM***	***Upper limit / Lower limit***	***Direction of cruising levels*** ↓	***Direction of cruising levels*** ↑	***Controlling unit Frequency {Airspace class} Remarks***
1	**2**	**3**	**4**	**5**	**6**	**7**

Route remarks:

-

Point/Segment Remarks:

(2) Segment from VPK to IDSEL use:
P123.7 MHz
S127.3 MHz
(3) Segment from IDSEL to UPVUN use:
P134.7 MHz
S134.15 MHz
(4) Segment from UPVUN to GULGU to contact Jakarta ACC.
(5) Segment from GULGU to OLKIT use:
P135.05 MHz
S 134.95 MHz
(6) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between GULGU and OLKIT) and not in the ADS-B Out exclusive airspace within the Singapore FIR.

Route Designator {RNP Type}		*[Route Usage Notes]*					
	Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}		*Track MAG* ↓/↑	*Dist NM*	*Upper limit / Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		**2**	**3**	**4**	**5**	**6**	**7**
M765		*Route availability:* (1) H24					
▲	IGARI	065612N 1033506E					
			53.3NM	FL 460 / FL 135	Even(1)	Odd(1)	[Class B](2)
▲	VENLI (WMFC/WSJC FIR BDRY)	062848N 1024900E					

Route remarks:
Lateral Limits:
10NM either side of line joining VKB DVOR/DME to IGARI.
Portion of M765 within the Singapore FIR has been delegated to Lumpur ACC for provision of ATS.
Lumpur ACC FREQ:
132.6MHz

Point/Segment Remarks:
(2) VKB 058°
88.8NM

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓ / ↑	*Dist NM*	*Upper limit* / *Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
M767	*Route availability:* (1) H24					
▲ TEGID (RPHI/WSJC FIR BDRY)	085656N 1155143E					
(10)	233° / -	242.5NM	FL 460 / FL 205			[Class A](2)(3)
▲ TODAM	063138N 1123536E					
(10)	233° / -	225.5NM	FL 460 / FL 205			[Class A](2)(3)
▲ TERIX	041521N 1093456E					
(10)	233° / -	54.0NM	FL 460 / FL 205			[Class A](2)(3)
▲ UKLIS (WSJC/WIIF FIR BDRY)	034234N 1085149E					
(10)	233° / -	132.8NM	FL 600 / FL 205	Even(1)		[Class A] [Class B](4)
▲ BOBOB	022206N 1070558E					
(10)	233° / -	69.6NM	FL 600 / FL 205	Even(1)		[Class A] [Class B](4)
▲ NIXEB (Delegated airspace BDRY)	013943N 1061040E					
(10)	232° / -	29.4NM	FL 600 / FL 205			[Class A - ABV FL150](5)
▲ TOMAN	012147N 1054717E					

Route remarks:
Uni-directional for south-west bound flights from TEGID to TOMAN. No PDC Flight Levels FL310, FL320, FL350, FL360, FL390, FL400 applicable. Other levels available with prior approval.
Flights above FL370 from NIXEB to TOMAN, see AIP Indonesia ENR2.1.

Point/Segment Remarks:
(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between TEGID and UKLIS) and not in the ADS-B Out exclusive airspace within the Singapore FIR.
(3) Segment from TEGID to UKLIS use:
P135.05 MHz
S134.95 MHz
(4) Segment from UKLIS to NIXEB to contact Jakarta ACC.
(5) Segment from NIXEB to TOMAN use:
P134.2 MHz
S133.35 MHz

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓ / ↑	*Dist NM*	*Upper limit* / *Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
M768	*Route availability:* (1) H24					
▲ AKMON	081254N 1101306E					
(10)		96.9NM	FL 460 / FL 135	Odd(1)	Even(1)	[Class A]
▲ LAGOT	071632N 1113243E					
(10)		76.9NM	FL 460 / FL 135	Odd(1)	Even(1)	[Class A]
▲ TODAM	063138N 1123536E					
(10)		55.4NM	FL 460 / FL 135	Odd(1)	Even(1)	[Class A]
▲ ASISU (WSJC/WBFC FIR BDRY)	055906N 1132046E					(2)

Route remarks:
ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover and not in the ADS-B Out exclusive airspace within the Singapore FIR.

Point/Segment Remarks:
(2) BRU 305°
113.3NM

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓ / ↑	*Dist NM*	*Upper limit* / *Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
M771	*Route availability:* (1) H24					
▲ DUDIS (WSJC/VVHM FIR BDRY)	070000N 1064836E					
(10)		156.2NM	FL 460 / FL 135			[Class A](2)(3)
▲ DOLOX	044841N 1052247E					(7)
(10)		42.5NM	FL 460 / FL 135			[Class A](4)
▲ DAMOG	041225N 1050014E					(8)
(10)		27.5NM	FL 460 / FL 135			[Class A](4)
▲ DUBSA	034901N 1044540E					(9)
(10)		26.6NM	FL 460 / FL 135			[Class A](5)
▲ VISAT	032620N 1043134E					(10)
(10)		21.7NM	FL 460 / FL 135			[Class A](5)
▲ OTLON	030752N 1042006E					(11)
(10)		5.4NM	FL 460 / FL 135			[Class A](5)
▲ RAXIM (WMFC/WSJC FIR BDRY)	030318N 1041713E					(12)
(10)		47.0NM	FL 460 / FL 135			[Class A](6)
▲ MERSING DVOR/DME (VMR)	022318N 1035218E					

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓/↑	*Dist NM*	*Upper limit* / *Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**

Route remarks:
Lateral Limits:
10NM either side of line joining VMR DVOR/DME to RAXIM and 25NM either side of line joining RAXIM to DUDIS.
Uni-directional for north-east bound flights from VMR to DUDIS. No PDC Flight Levels FL310, FL320, FL350, FL360, FL390, FL400 applicable. Other levels available with prior approval.

Point/Segment Remarks:
(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between DOLOX and DUDIS) and not in ADS-B Out exclusive airspace within the Singapore FIR.
(3) Segment from DUDIS to DOLOX use:
P134.9 MHz
S134.35 MHz
(4) Segment from DOLOX to DUBSA use:
P123.7 MHz
S127.3 MHz
(5) Segment from DUBSA to RAXIM use:
P134.7 MHz
S134.15 MHz
(6) Segment from RAXIM to VMR use:
P133.8 MHz
S127.3 MHz
(7) VMR 031°
170.6NM
(8) VMR 031°
128.1NM
(9) VMR 032°
100.6NM
(10) VMR 032°
74.0NM
(11) VMR 032°
52.4NM
(12) VMR 032°
47.0NM

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓/↑	*Dist NM*	*Upper limit / Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
M772	*Route availability:* (1) H24					
▲ LAXOR (WSJC/RPHI FIR BDRY)	094937N 1144829E					
(10)	020° -	147.5NM	FL 460 FL 240		Even(1)	[Class A]
▲ BIDAG	073101N 1135544E					
(10)	020° -	97.9NM	FL 460 FL 240		Even(1)	[Class A](2)
▲ ASISU (WBFC/WSJC FIR BDRY)	055906N 1132046E					

Route remarks:
Available only for flights departing from:
- WIII and WIHH to VHHH and airports in People's Republic of China.
- WBGB, WBSB, WBGG, WBKL, WBGR and WBGS to VHHH only.

ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover and not in ADS-B Out exclusive airspace within the Singapore FIR.

Point/Segment Remarks:
(2) BRU 305°
113.3NM

Route Designator {RNP Type}		*[Route Usage Notes]*					
	Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}		*Track MAG* ↓/↑	*Dist NM*	*Upper limit / Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1		**2**	**3**	**4**	**5**	**6**	**7**
M774		*Route availability:* (1) H24					
▲	JUNHA	005413N 1043052E					
(10)		101° / 281°	61.3NM	FL 600 / 5500 FT ALT	Odd(1)	Even(1)	[Class A - ABV FL150] [Class B - BLW FL150]
▲	OTLAL (Delegated airspace BDRY)	004209N 1053052E					
(10)		101° / 281°	86.8NM	FL 600 / 5500 FT ALT	Odd(1)	Even(1)	[Class A] [Class B]
▲	OBDOS	002503N 1065551E					

Route Remarks:
Singapore ACC FREQ:
P134.4 MHz S128.1 MHz
Flight Planning:
Flights overflying Singapore to destinations north of Kuala Lumpur and Subang to flight plan via M774 JUNHA IRTAD A464 SJ G579 VJB Y342 AROSO Y513.
Flights overflying Singapore to land at Kuala Lumpur and Subang to flight plan via M774 JUNHA IRTAD A464 SJ G579 VJB A457.
All departures from Singapore aerodromes joining ATS route M774 to flight plan via HOSBA G580 DODSO T21.
Flights above FL370 between JUNHA and OBDOS, see AIP Indonesia ENR 2.1.

Point/Segment Remarks:
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Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓/↑	*Dist NM*	*Upper limit / Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
M904	*Route availability:* (1) H24					
▲ TIDAR (WSJC/VTBB FIR BDRY)	065230N 1025000E					
(10)	144°/324°	19.8NM	FL 460 / 6500 FT ALT	Odd(1)	Even(1)	[Class A (FL290 and ABV)]
▲ ODONO	063614N 1030129E					
(10)	144°/324°	33.1NM	FL 460 / FL 145	Odd(1)	Even(1)	[Class A (FL290 and ABV)]
▲ UPRON	060903N 1032040E					
(10)	144°/324°	93.4NM	FL 460 / FL 245	Odd(1)	Even(1)	[Class A (FL290 and ABV)]
▲ ENREP	045224N 1041442E					

Route remarks:
Singapore ACC FREQ:
P134.9 MHz
S134.35 MHz
ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover and not in the ADS-B Out exclusive airspace within the Singapore FIR.

Point/Segment Remarks:
-

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓ / ↑	*Dist NM*	*Upper limit* / *Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	2	3	4	5	6	7
N884	*Route availability:* (1) H24					
▲ LAXOR (WSJC/RPHI FIR BDRY)	094937N 1144829E					
(10)	051° -	246.6NM	FL 460 / 6500 FT ALT			[Class A](2)(3)
▲ LAGOT	071632N 1113243E					
(10)	051° -	242.9NM	FL 460 / 6500 FT ALT			[Class A](2)(3)
▲ RILRI (WSJC/WIIF FIR BDRY)	044343N 1082239E					
(10)	051° -	111.5NM	FL 600 / 6500 FT ALT		Odd(1)	[Class A] [Class B] [Class C](4)
▲ LUSMO	033341N 1065534E					
(10)	069° -	53.0NM	FL 600 / 6500 FT ALT		Odd(1)	[Class A] [Class B](4)
▲ LEBIN	031438N 1060604E					
(10)	069° -	32.2NM	FL 600 / 6500 FT ALT		Odd(1)	[Class A] [Class B](4)
▲ OLMUT (Delegated airspace BDRY)	030306N 1053558E					
(10)	069° -	22.5NM	FL 600 / 6500 FT ALT			[Class A - ABV FL150] [Class B - BLW FL150](5)
▲ VEGLO (WSJC/WIIF FIR BDRY)	025502N 1051457E					
(10)	069° -	3.7NM	FL 460 / 6500 FT ALT			[Class A](5)
▲ LIPRO	025342N 1051128E					
(10)	069° -	34.2NM	FL 460 / 6500 FT ALT			[Class A](5)
▲ LENDA (WSJC/WMFC FIR BDRY)	024124N 1043932E					
(10)	069° -	50.6NM	FL 460 / 6500 FT ALT			[Class A](6)
▲ MERSING DVOR/DME (VMR)	022318N 1035218E					

Route Designator {RNP Type}	***[Route Usage Notes]***					
Significant Point Name	***Significant Point Coordinates***					***Remarks***
{RNP Type}	***Track MAG*** ↓ / ↑	***Dist NM***	***Upper limit*** / ***Lower limit***	***Direction of cruising levels*** ↓	***Direction of cruising levels*** ↑	***Controlling unit Frequency {Airspace class} Remarks***
1	**2**	**3**	**4**	**5**	**6**	**7**

Route remarks:
Uni-directional for east bound flights from VMR to LAXOR. No PDC Flight Levels FL310, FL320, FL350, FL360, FL390, FL400 applicable. Other levels available with prior approval.
Flight planning:
Not available for flight planning between VMR and OLMUT. Flight Plan via TOMAN L625.
Flights above FL370 from VEGLO to OLMUT, see AIP Indonesia ENR2.1.

Point/Segment Remarks:
(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between RILRI and LAXOR) and not in the ADS-B Out exclusive airspace within the Singapore FIR.
(3) Segment from RILRI to LAXOR use:
P135.05 MHz
S134.95 MHz
(4) Segment from OLMUT to RILRI to contact Jakarta ACC.
(5) Segment from OLMUT to LENDA use:
P134.7 MHz
S134.15 MHz
(6) Segment from LENDA to VMR use:
P133.8 MHz
S127.3 MHz

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓/↑	*Dist NM*	*Upper limit / Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
N891	*Route availability:* (1) H24					
▲ IGARI (WSJC/VVHM FIR BDRY)	065612N 1033506E					
(10)	162° / 342°	65.4NM	FL 460 / FL 155	Odd(1)	Even(1)	[Class A](2)
▲ IKUMI	055338N 1035509E					
(10)	162° / 342°	64.0NM	FL 460 / FL 155	Odd(1)	Even(1)	[Class A](2)
▲ ENREP	045224N 1041442E					
(10)	185° / 005°	75.5NM	FL 460 / FL 155	Odd(1)	Even(1)	[Class A](3)
▲ UGPEK	033647N 1040752E					
(10)	185° / 005°	11.7NM	FL 460 / FL 155	Even(1)	Odd(1)	[Class A](3)
▲ URIGO	032505N 1040647E					
(10)	184° / 004°	10.6NM	FL 460 / FL 155	Even(1)	Odd(1)	[Class A](3)
▲ MANIM (WMFC/WSJC FIR BDRY)	031430N 1040554E					
(10)	185° / 005°	2.6NM	FL 460 / FL 155	Even(1)	Odd(1)	[Class A](4)
▲ OBDAB	031153N 1040538E					
(10)	185° / 005°	106.4NM	FL 460 / FL 155	Even(1)	Odd(1)	[Class A](4)
▲ PAPA UNIFORM DVOR/DME (PU)	012524N 1035600E					(5)

Route remarks:
ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover and not in the ADS-B Out exclusive airspace within the Singapore FIR.

Point/Segment Remarks:
(2) Segment from IGARI to ENREP use:
P134.9 MHz
S134.35 MHz
(3) Segment from ENREP to MANIM use:
P123.7 MHz
S127.3 MHz
(4) Segment from MANIM to PU use:
P133.8 MHz
S127.3 MHz
(5) WSJC/WMFC FIR boundary approximately 0.4NM North of PU.

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓ / ↑	*Dist NM*	*Upper limit* / *Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
N892	*Route availability:* (1) H24					
▲ MELAS (VVHM/WSJC FIR BDRY)	070518N 1080912E					
(10)		203.6NM	FL 460 / FL 135			[Class A](2)(3)
▲ MABLI	041717N 1061247E					(6)
(10)		52.1NM	FL 460 / FL 135			[Class A](4)
▲ MUMSO	034420N 1053213E					(7)
(10)		25.2NM	FL 460 / FL 135			[Class A](4)
▲ MABAL	032826N 1051236E					(8)
(10)		41.4NM	FL 460 / FL 135			[Class A](4)
▲ KILOT	030217N 1044023E					(9)
(10)		15.7NM	FL 460 / FL 135			[Class A](4)
▲ KIBOL (WSJC/WMFC FIR BDRY)	025224N 1042818E					(10)
(10)		28.1NM	FL 460 / FL 135			[Class A](5)
▲ PEKLA	023437N 1040618E					(11)
(10)		18.0NM	FL 460 / FL 135			[Class A](5)
▲ MERSING DVOR/DME (VMR)	022318N 1035218E					

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓ / ↑	*Dist NM*	*Upper limit* / *Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**

Route remarks:
Lateral Limits:
10NM either side of line joining VMR DVOR/DME to KIBOL and 25NM either side of line joining KIBOL to MELAS.
Uni-directional for south-west bound flights from MELAS to VMR. No PDC Flight Levels FL310, FL320, FL350, FL360, FL390, FL400 applicable. Other levels available with prior approval.
Flight planning for Direct Routing Operations (DRO):
Arriving aircraft into Singapore Changi Airport operating at FL290 to FL460 (inclusive) and entering Singapore FIR via MELAS should flight plan using the direct route MELAS DCT MABAL.
All other aircraft operating at FL290 to FL460 (inclusive) and entering Singapore FIR via MELAS should flight plan using the direct route MELAS DCT MABAL.

Point/Segment Remarks:
(2) ADS-C and CPDLC services are available to suitably equipped aircraft operating outside radar cover (between MELAS and MABLI) and not in the ADS-B Out exclusive airspace within the Singapore FIR.
(3) Segment from MELAS to MABLI use:
P134.9 MHz
S134.35 MHz
(4) Segment from MABLI to KIBOL use:
P134.7 MHz
S134.15 MHz
(5) Segment from KIBOL to VMR use:
P133.8 MHz
S127.3 MHz
(6) VMR 051°
180.6NM
(7) VMR 051°
128.4NM
(8) VMR 051°
103.2NM
(9) VMR 051°
61.8NM
(10) VMR 050°
46.1NM
(11) VMR 051°
18.0NM

Route Designator {RNP Type}	*[Route Usage Notes]*					
Significant Point Name	*Significant Point Coordinates*					*Remarks*
{RNP Type}	*Track MAG* ↓ ↑	*Dist NM*	*Upper limit* / *Lower limit*	*Direction of cruising levels* ↓	*Direction of cruising levels* ↑	*Controlling unit Frequency {Airspace class} Remarks*
1	**2**	**3**	**4**	**5**	**6**	**7**
P501	*Route availability:* (1) H24					
▲ ARAMA (Delegated airspace BDRY)	013654N 1030712E					
(10)	146° -	25.0NM	FL 460 9500 FT ALT	Odd(1)		[Class A - ABV FL150] [Class B - BLW FL150](2)
▲ ANBUS (WMFC/WIIF FIR BDRY) (Delegated airspace BDRY)	011554N 1032100E					
(10)	146° -	16.0NM	FL 600 9500 FT ALT	Odd(1)		[Class A - ABV FL150] [Class B - BLW FL150](2)
▲ BOBAG	010230N 1032954E					
(10)	134° -	41.2NM	FL 600 FL 275	Odd(1)		[Class A](3)
▲ UXATI	003348N 1035933E					
(10)	134° -	19.2NM	FL 600 FL 275	Odd(1)		[Class A](3)
▲ POSOG	002024N 1041323E					
(10)	134° -	53.7NM	FL 600 FL 275	Odd(1)		[Class A](3)
▲ ANITO	001700S 1045200E					

Route remarks:
Flights above FL370 from ANBUS to ANITO, see AIP Indonesia ENR2.1.

Point/Segment Remarks:
(2) Segment from ARAMA to BOBAG use:
P133.25 MHz
S135.8 MHz
(3) Segment from BOBAG to ANITO use:
P134.4 MHz
S128.1 MHz

ENR 3.5 OTHER ROUTES

1 SINJON CROSSING BY MILITARY AIRCRAFT

1.1 Introduction

1.1.1 In order to facilitate the movement of various types of military traffic operating through the Changi Control Zone without impeding the flow of procedural traffic operating into and out of the Zone, the following procedures have been established for strict compliance by pilots-in-command (refer to chart ENR 3.5-3).

1.2 Crossing by Slow-moving Military Aircraft (Slow-lane Crossings)

1.2.1 All slow-moving military aircraft are permitted to cross the Changi CTR 8.1NM and 6.7NM south of the extended centreline of RWY 02L and RWY 02C respectively. EASTBOUND and WESTBOUND flights at 500ft AMSL without reference to Singapore Tower or Singapore Approach.

1.2.2 The EASTBOUND is from PULAU AYER MERBAU (01 16 00 N 103 43 40 E) on track of 110° MAG to the northern tip of Lazarus Island (SINJON). Thereafter, the track is 89° MAG to Point “E1” (10 DME SJ) and then direct to NEXUS [34 DME SJ R-077 (23 DME VTK R-100)] (01 20 48 N 104 24 24 E).

1.2.3 The WESTBOUND is from NEXUS direct to Point “E1”. Thereafter, the track is 269° MAG to the northern tip of Lazarus Island (SINJON) and then 290°MAG until entering Tengah Aerodrome Traffic Zone.

1.3 Crossing by Fast-moving Military Aircraft (Fast-lane Crossings)

1.3.1 All fast-moving military aircraft are permitted to cross the Changi Control Zone 9.4NM and 8NM south of the extended centreline of RWY 02L and RWY 02C respectively. EASTBOUND flights are to operate at 1,000ft AMSL and WESTBOUND flights at 500ft AMSL without reference to Singapore Tower or Singapore Approach.

1.3.2 The EASTBOUND is from PULAU SAKRA (01 15 45 N 103 42 00 E) on a track of 115° MAG to Pulau Bukom Kechil and then track 110° MAG to 1NM south of the southern tip of Lazarus Island (SINJON). Thereafter, the track is 089° MAG to Point “E” (01 12 21 N 104 01 21 E) and then direct to SIERRA (01 18 30 N 104 26 00 E).

1.3.3 The WESTBOUND is from Point “E” on the reciprocal of the eastbound track to PULAU SAKRA.

1.4 SINJON Crossings at 1,500 FT

1.4.1 Eastbound and Westbound military aircraft are permitted to cross Changi Control Zone via the Low Level track at 1,500ft without reference to Singapore Tower or Singapore Approach. The Low Level track is established from SIERRA to SJ DVOR via Point "E" and a point 0.5NM north of PULAU SAMBU (01 10 45 N 103 53 56 E). Aircraft on the Low Level track are only allowed to maintain 1,500ft and below between SJ DVOR and PULAU SAMBU.

1.5 Operating Hours of SINJON Crossings

1.5.1 SINJON Crossings are applicable at all times of the day.

1.6 Suspension of Unrestricted Military Crossings

1.6.1 In view of military traffic crossing the Changi CTR to the south, whenever it is known or has been made known that procedural or civil training traffic are unable for reasons of load or performance, etc., to effect a normal climb on RWY 20R/20C, the unrestricted crossings shall be suspended and the RSAF FIS Controller be informed immediately.

1.6.2 All aircraft departing on RWY 20R/20C on SID are required to cross 8 DME VTK at or above 2,000ft. If the height restriction cannot be complied with, the pilot-in-command of an aircraft departing on RWY 20R/20C shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure.

1.7 Altimeter Setting

1.7.1 The Singapore QNH setting shall be used by military aircraft crossing the Changi CTR under the above procedures.

1.8 Emergency

1.8.1 In the event of an emergency occurring to a procedural aircraft in the area e.g. an engine cut on takeoff or landing etc., all unrestricted military crossings under these procedures shall be forthwith suspended. Such suspensions shall be notified immediately to the Duty RSAF FIS Controller, SATCC.

2 TRANSIT CHANNEL

2.1 Introduction

2.1.1 To ensure safety of aircraft operations and minimise interruptions to aircraft operating in Light Aircraft Training Area A, a transit channel is established for military traffic to transit through. The Transit Channel will be all the airspace within Area A north of Mandai Road.

2.2 Activation

2.2.1 The Transit Channel will be activated only when there is a military aircraft crossing. Activation will be initiated by Paya Lebar Approach. All aircraft operating within the area are advised to vacate the channel on receipt of the activation. Such aircraft shall report their intentions to Paya Lebar Approach.

2.2.2 To ensure safety of operation, all aircraft operating within the lateral and vertical limits of the channel shall notify Paya Lebar Approach.

2.3 Dimensions

2.3.1 The co-ordinates for the Channel are:

012714N 1034752E 012442N 1034705E 012438N 1034556E 012650N 1034619E.
(refer to chart ENR 3.5-3).

2.4 Vertical Limits

2.4.1 Ground level to 2,000ft.

3 HORSBURGH LIGHTHOUSE

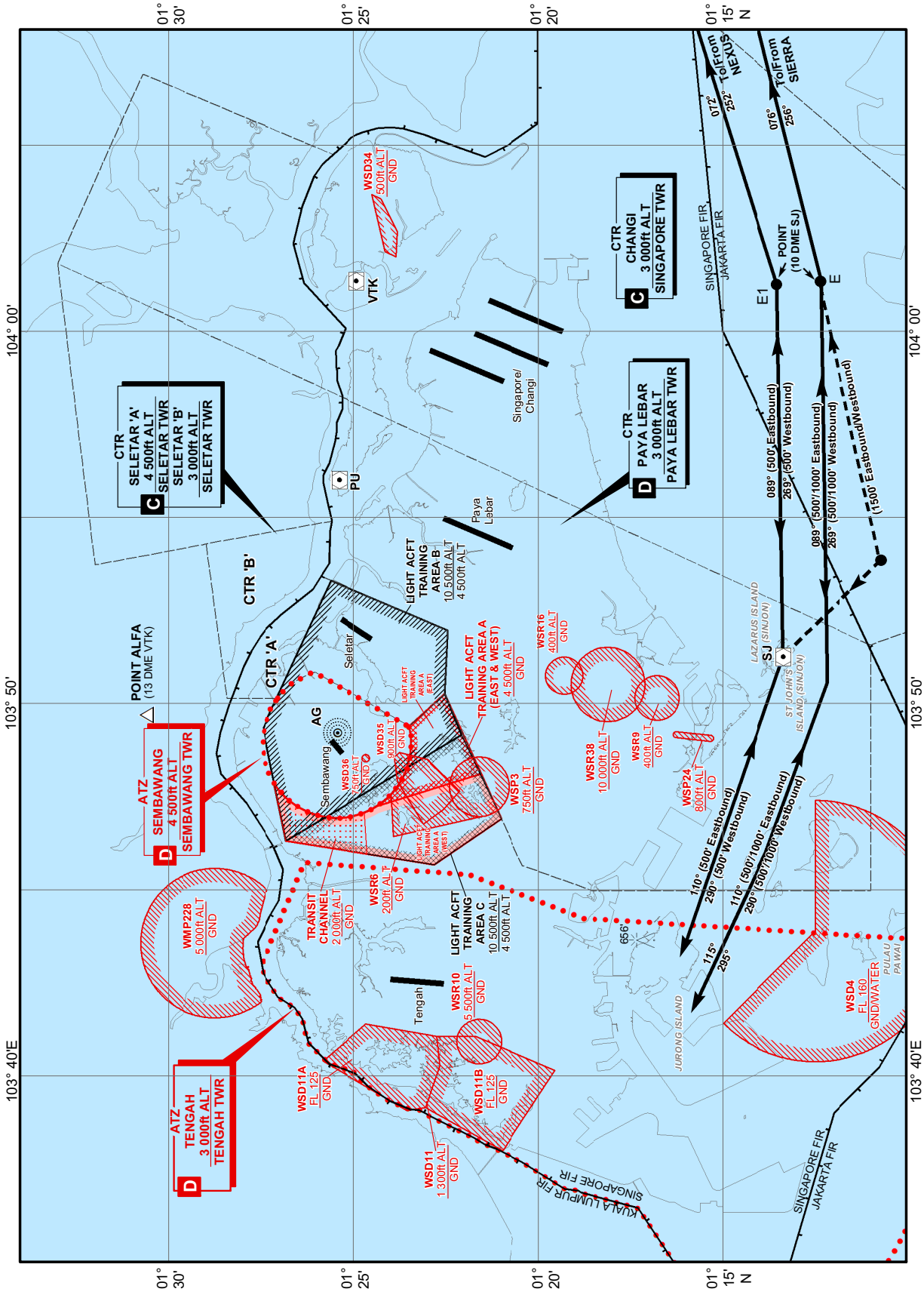
3.1 Horsburgh Lighthouse (011949N 1042420E) is a visual reference point for VFR flights.

3.2 For the purpose of safe navigation, all VFR traffic in the vicinity of the Horsburgh Lighthouse shall exercise extra caution when approaching the area.

3.3 Vertical Limits: Ground/sea level to 2,000 feet for VFR flights.
Note: Minimum flight altitude on ATS Route G580 above the Horsburgh Lighthouse is 3,000 feet.

3.4 The Singapore QNH shall be used by all aircraft in the vicinity of Horsburgh Lighthouse.

VMC CROSSING BY MILITARY AIRCRAFT



4 HELICOPTER OPERATIONS OVER SINGAPORE ISLAND

4.1 INTRODUCTION

4.1.1 The rapid building development in many parts of Singapore has made it necessary for helicopter operations to be more stringently regulated in order to enhance safety. All helicopter operators are required to adhere strictly to the following procedures.

4.2 RESTRICTED AREA -SINGLE-ENGINE HELICOPTER OPERATIONS RESTRICTED

4.2.1 Single-engine helicopters are restricted from operating over and within the city area enclosed in the triangle bounded by the following locations:

a) South of Rochor River/Kallang River (011817N 1035205E);
b) Shenton Way/Keppel Road (011623N 1035045E); and
c) Scotts Road/Orchard Road (011818N 1034954E).

4.2.2 Part of this triangle lies within the existing Restricted Area WSR38 (see charts ENR 3.5-8 and ENR 3.5-9).

4.3 ROUTINGS

4.3.1 All helicopters must fly over water or use routes approved by the CAAS. There are two over-water and one over-land helicopter routes.

4.3.2 These helicopter routes are to be flown in VMC and in daylight hours. They could either be flown separately or in combination (see chart ENR 3.5-8).

4.4 OVER-WATER ROUTES

4.4.1 One of the two over-water routes is to the north of Singapore Island for helicopter flights into and out of Seletar Aerodrome. The other route is along the southern shore of Singapore. They are as described below.

4.4.1.1 **Heli-Route Alpha**

4.4.1.2 This route covers the area from Johor Causeway eastbound over water along Selat Johor, following the coastline of Singapore Island via the northern contour of Pulau Ubin and along the eastern coastline, down to Bedok Jetty (011819N 1035632E) and vice versa. Within the vicinity of Changi Naval Base (CNB), transiting helicopters are to keep laterally clear by tracking along the following markers located about 1km from the Naval Base (see table below and diagram on page ENR 3.5-5).

	Markers Description	*Coordinates*	*Remarks*
a)	CHANGI BEACON	01 19 09 N 104 02 06 E	WHITE lights, 3 flashes every 15 sec
b)	BUOY CNB-04	01 18 44 N 104 02 24 E	YELLOW buoy, 3m above waterline YELLOW lights, 1 flash every 2 sec
c)	BUOY CNB-03	01 18 09 N 104 02 24 E	YELLOW buoy, 3m above waterline YELLOW lights, 1 flash every 2 sec
d)	BUOY CNB-02	01 18 06 N 104 01 00 E	YELLOW buoy, 3m above waterline YELLOW lights, 1 flash every 2 sec
e)	BUOY CNB-01	01 18 29 N 104 00 59 E	YELLOW buoy, 3m above waterline YELLOW lights, 1 flash every 2 sec
f)	Singapore Armed Forces Yacht Club Jetty	01 18 51 N 104 00 58 E	Yellow lights, 3 lamp posts along jetty
Note: Pilots are to adhere strictly to the above transit routes.			

Height: Minimum 200ft AMSL or as specified by the appropriate air traffic control authority.

ENROUTE CHART - ICAO

LEGEND

Aerodrome

Flight Information Region (FIR)
Name of FIR — SINGAPORE; Upper Limit — UNL; Lower Limit — GND/WATER; Unit providing service — ACC SINGAPORE

Terminal Control Area (TMA)
Name of TMA — KUCHING; Airspace Classification — A B C; Upper Limit — FL 250; Lower Limit — 3 000ft; Radio Frequency (ies) — 134.5,120.2

Control Zone (CTR)
Name of CTR — KUCHING; Airspace Classification — C; Upper Limit — 3 000ft; Radio frequency (ies) — 120.2

ATS route
Route designator — L642; Magnetic track — 032°; Distance in nautical miles — 122; Minimum flight altitude (ft)/flight level — 7 000/FL 140; Lower limit (ft)/flight level — (7 000)/(FL 140); Required navigation performance — RNP 10

ATS route reporting point by-pass
(No report is required on this route)

Reporting Point (REP) — Compulsory; On Request

ATS/MET reporting point (MRP) — Compulsory; On Request

Restricted Airspace
(P-Prohibited, R-Restricted, D-Danger)
Identification of area — WSD8; Nationality letter; Vertical limits — FL 400 / WATER

Note : Restricted airspace outside Singapore FIR are not shown

Collocated VOR and DME navigation aids (VOR/DME)
Compass rose orientated on the chart to Magnetic North

Identification for radio navigation aids (NAVAID)
Name — SINJON; NAVAID, frequency, identification or call sign — DVOR/DME 113.5 SJ; Geographical coordinates in WGS-84 — 01°13'21"N 103°51'15"E; Elevation of DME site (to the nearest 30m) — 60m

COP at mid-point between VOR are not shown

Area Minimum Altitude (AMA)

Each 2° quadrilateral contains an area minimum altitude (AMA) which represents the lowest altitude which may be used under instrument meteorological conditions (IMC). The AMA provides a minimum clearance of 1 000 feet (300m) above all terrains and obstacles in the quadrilateral. It is represented in thousands and hundreds of feet above mean sea level.

Example : 3 500 feet 35

A — Airway in which Mach Number Technique and RNAV are applied (Refer to pages ENR 1.8-13 to 1.8-18)

B — Inbound and Outbound flights exempted from reporting aircraft observations at these points.

WSJC/WMFC FIR BDRY REPORTING POINTS	
TAXUL 03 50 35N 103 40 37E	**MANIM** 03 14 30N 104 05 54E
BUVAL 03 36 22N 103 43 41E	**KETOD** 03 10 42N 104 09 42E
DOVOL 03 30 47N 103 49 23E	**RAXIM** 03 03 18N 104 17 13E
IDSEL 03 24 32N 103 55 44E	**KIBOL** 02 52 24N 104 28 18E
EGOLO 03 19 34N 104 00 47E	**LENDA** 02 41 24N 104 39 32E

RVSM SEPARATION AVAILABLE SINGAPORE FIR BTN FL 290 AND FL 410 (Inclusive)

AIRSPACE CLASSIFICATION IN THE SINGAPORE FIR

Airspace		Levels	Classification
Controlled airspace		FL 150 to FL 460	A
		Surface to FL 150	B
Controlled airspace more than 100 nm seaward from the shoreline		Lower limit to FL 460	A
Control Zones (CTRs)	Changi CTR	Surface to upper limit	C
	Paya Lebar CTR		D
	Seletar CTR		C
ATZs		Surface to upper limit	D
Uncontrolled airspace			G*

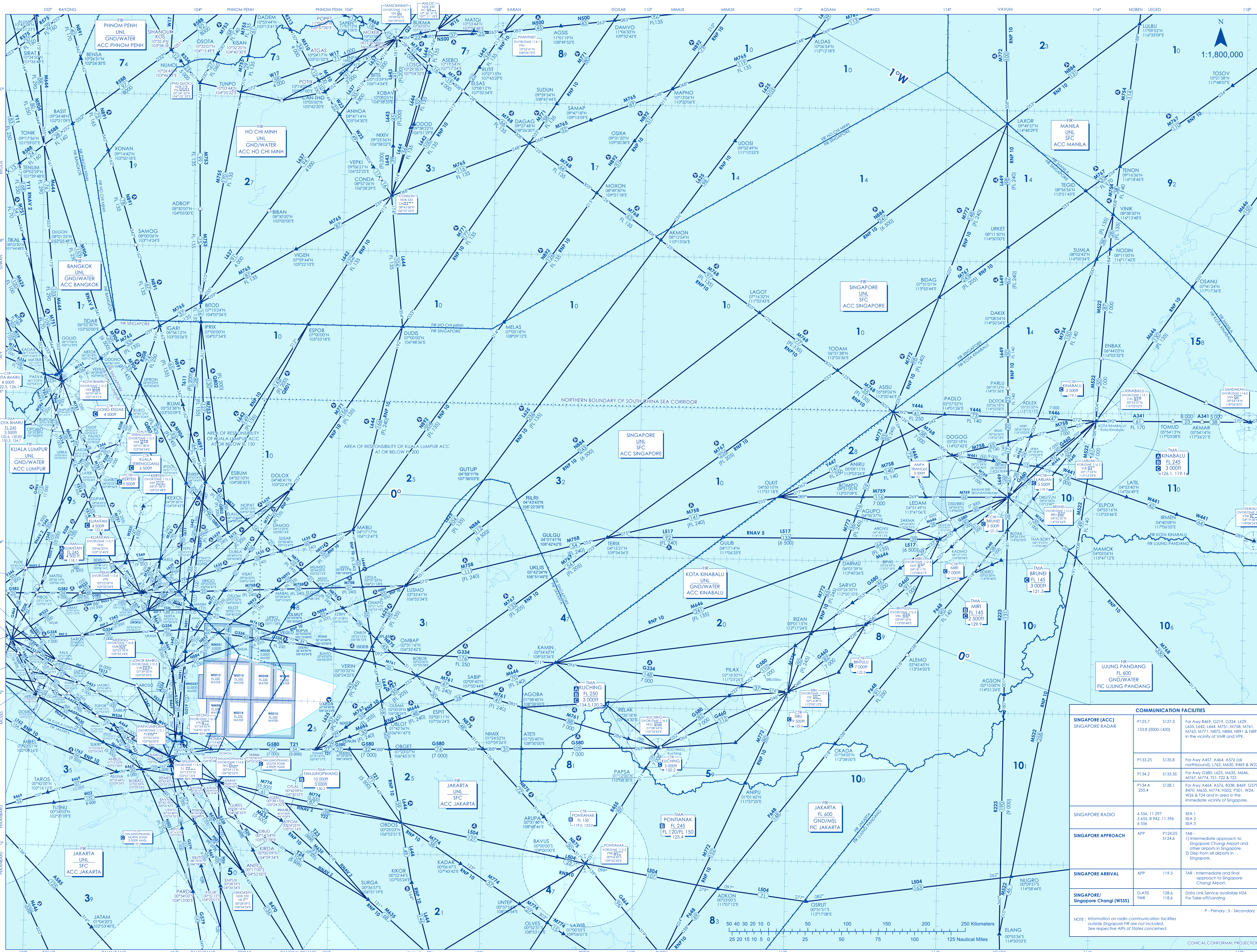
* Aircraft operating in Light Aircraft Training Areas A, B and C (please refer to AIP Singapore page ENR 5.2-1) are required to have continuous two-way communications with the appropriate ATS authority.

CAUTION

Consult respective NOTAMs and AIPs of States concerned for the latest information and the Civil Aviation Authority of Singapore does not accept responsibility for any errors or omissions in the information shown outside of Singapore FIR

MAGNETIC INFORMATION FOR THE YEAR 2020

VAR 0°23'E (2020)



COMMUNICATION FACILITIES		
SINGAPORE (ACC) SINGAPORE RADAR	P123.7 S127.3 133.8 (0000-1430)	For Awy B469, G219, G334, L629, L635, L642, L644, M751, M758, M761, M763, M771, N875, N884, N891 & N892 in the vicinity of VMR and VPK.
	P133.25 S135.8	For Awy A457, A464, A576 (all northbound), L762, M630, R469 & W22
	P134.2 S133.35	For Awy G580, L625, M635, M646, M767, M774, T21, T22 & T23
	P134.4 S128.1 255.4	For Awy A464, A576, B338, B469, G579, B470, M635, M774, N502, P501, W24, W26 & T24 and in area in the immediate vicinity of Singapore.
SINGAPORE RADIO	6 556, 11 297 5 655, 8 942, 11 396 6 556	SEA 1 SEA 2 SEA 3
SINGAPORE APPROACH	APP P124.05 S124.6	TAR - 1) Intermediate approach to Singapore Changi Airport and other airports in Singapore. 2) Dep from all airports in Singapore.
SINGAPORE ARRIVAL	APP 119.3	TAR - Intermediate and final approach to Singapore Changi Airport.
SINGAPORE/ Singapore Changi (WSSS)	D-ATIS 128.6 TWR 118.6	Data Link Service available H24. For Take-off/Landing

P - Primary ; S - Secondary

NOTE : Information on radio communication facilities outside Singapore FIR are not included. See respective AIPs of States concerned.

CHANGES : Removed ADS-B out exclusive airspace at or above FL 290. Editorial changes within Singapore FIR.

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AD 0.6 TABLE OF CONTENTS TO PART 3

AD 1 AERODROMES/HELIPORTS - INTRODUCTION

AD 1.1 AERODROME AVAILABILITY

1 INTRODUCTION

1.1 This section contains information on all aerodromes which are available for international and domestic aircraft operations. Section AD 1 describes the use of aerodromes and the clearance formalities involved. Section AD 2 contains information on the physical characteristics of aerodromes available for international and domestic operations.

As there are no heliports, section AD 3 has been omitted.

1.2 AERODROMES ADMINISTRATION

1.2.1 The administration of the civil aerodromes is the responsibility of the Civil Aviation Authority of Singapore.

1.2.2 REGULATIONS CONCERNING AIRPORT USE

1.2.2.1 Standard conditions applicable to the landing, parking or storage of aircraft on aerodromes under the control of the Civil Aviation Authority of Singapore are as follows:

a) The fees and charges for the landing, parking or housing of aircraft shall be those prescribed in section GEN 4.
b) The Director-General of Civil Aviation shall have a lien on the aircraft, its parts and accessories, for such fees and charges as aforesaid.
c) If payment of such fees and charges is not made to the Director-General of Civil Aviation within fourteen days after a letter demanding payment thereof has been sent by post addressed to the registered owner of the aircraft, the Director-General of Civil Aviation shall be entitled to sell, remove, destroy or otherwise dispose of the aircraft, and of its parts and accessories, and to apply the proceeds from so doing to the payment of such fees and charges.
d) Neither the Director-General of Civil Aviation nor any servant or agent of the Government shall be liable for loss of or damage to the aircraft, its parts or accessories or any property contained in the aircraft, howsoever such loss or damage may arise, occurring while the aircraft is on any of the aerodromes under the control of CAAS or is in the course of landing or taking-off at any such aerodrome, or of being removed or dealt with elsewhere.

1.2.3 LANDINGS MADE ELSEWHERE OTHER THAN AT ALTERNATE AIRPORTS

1.2.3.1 If a landing is made elsewhere other than at an international airport or a designated alternate airport, the pilot-in-command shall report the landing as soon as practicable to the health, customs and immigration authorities at the international airport at which the landing was scheduled to take place. This notification may be made through any available communication link.

1.2.3.2 The pilot-in-command shall be responsible for ensuring that:

a) If pratique has not been granted to the aircraft at the previous landing, contact between other persons on the one hand and the passengers and crew on the other is avoided;
b) That cargo, baggage and mail are not removed from the aircraft except as provided below;
c) Any foodstuffs of overseas origin, of any plant material is not removed from the aircraft except where local food is unobtainable. All food refuse including peelings, cores, stones of fruit, etc., must be collected and returned to the galley refuse container, the contents of which should not be removed from the aircraft except for hygiene reasons, in which case they must be destroyed by burning or deep burial.

1.2.4 TRAFFIC OF PERSONS AND VEHICLES ON AERODROMES

1.2.4.1 Demarcation of Zones

1.2.4.1.1 The grounds of each aerodrome are divided as follows:

a) a public zone comprising the part of the aerodrome open to public;
b) a security area comprising the rest of the aerodrome.

1.2.4.2 Movement of Persons

1.2.4.2.1 Access to the security area is authorised only under conditions prescribed by CAAS.

1.2.4.2.2 The customs, police and health inspection offices and the premises assigned to transit traffic are normally accessible only to passengers, to staff of the public authorities and airlines and to authorised persons in pursuit of their duty.

1.2.4.2.3 The movement of persons having access to the security area is subject to the special rules laid down by CAAS.

1.2.4.3 Movement of Vehicles

1.2.4.3.1 The movement of vehicles in the security area is strictly limited to specially approved vehicles driven by authorised persons.

1.2.4.3.2 Drivers of vehicles, of whatever type, driving within the confines of the aerodrome, must respect the direction of the traffic signs and the posted speed limits and generally comply with the provisions of the Civil Aviation Authority of Singapore (Aerodrome) Regulations and with instructions given by the competent authorities.

1.2.4.4 Policing

1.2.4.4.1 Care and protection of aircraft, vehicles, equipment and goods for which the aerodrome facilities are used are not the responsibility of the State or any concessionaire who cannot be responsible for loss or damage which is not incurred through action by them or their agents.

1.3 CONDITIONS OF AVAILABILITY

1.3.1 Aerodromes marked as military are not available for public use unless prior permission has been obtained.

2 APPLICABLE ICAO DOCUMENTS

2.1 ICAO Standards and Recommended Practices are applied in accordance with Annex 14.

3 CIVIL USE OF MILITARY AIR BASES

3.1 Conditions of Use

3.1.1 Military aerodromes may be used by civil aircraft:

a) at any time in genuine emergency requiring immediate landing at the nearest aerodrome;
b) on agreed scheduled services;
c) at other times with the permission of the authority responsible for the aerodrome, obtained prior to taking off for the aerodrome.

3.2 Civil aircraft using military aerodromes are subject to landing, housing and parking appropriate. Captains of aircraft are to report to ATC after landing and prior to taking off.

3.3 No responsibility will be undertaken for the provision of fuel oil, maintenance or other facilities except in cases of distress or exceptional circumstances. Pilots may make their own arrangements with civil fuel agents to refuel their civil aircraft on the aerodrome, provided that they furnish adequate cover against damage or loss arising from the presence of the agent's equipment and that prior permission is obtained from the Commanding Officer of the station.

3.4 Passengers embarking from this aerodrome will also have to pay the passenger service charge, where applicable. Foreign military aircraft are normally exempted by MINDEF Singapore from the airport charges. If exemption has not been granted, charges will be levied on foreign military aircraft.

3.5 Liability will not be accepted by the controlling Authority, its servants or agents, or by any agent or servant of the Government for the loss or damage, by accident, fire, flood, tempest, explosion of any other cause, to aircraft; or for loss or damage, from whatever cause arising to goods, mail or other articles, or for loss or injury from whatever cause, arising to passengers or other persons (including pilots, engineers or other personnel of aircraft), landing at, departing from, or accommodated in or at any service aerodrome; even if such loss, damage or injury is caused by or arises from negligence on the part of the Authority's servants or agents or of any servant or agent of the Government.

3.6 The use of any apparatus such as tractors, cranes, chocks, starter trolleys, etc., belonging to or under the charge of the controlling authority by the personnel of aircraft or other persons making use of the aerodrome, will be entirely at the risk of the person using such apparatus, and no liability will be accepted for any loss, damage or injury caused by or arising from the use of any such apparatus (whether under the control or management of any servant or agent of the controlling authority of the Government or otherwise) which may result to the user thereof or to any other person or thing. The use of such apparatus will be permitted only upon the understanding that the controlling authority and the Government will be held indemnified against all claims which may result from such use. It must, further be clearly understood that the controlling authority does not in any way guarantee the safety or fitness of any such apparatus or of any equipment, petrol or oil, or similar products, supplied.

3.7 Production of Documents for Inspection

3.7.1 The pilot-in-command of an aircraft shall produce to any authorised person as and when requested by that person to do so, within reasonable time before the commencement or after the termination of a flight, any of the following documents:

a) Certificate of Airworthiness;
b) Certificate of Registration;
c) The licences of its operating crew and of any person required under paragraph 19 of the Air Navigation Order to be the holder of such a licence;
d) The Telecommunications Log Book in all cases which is required under the Air Navigation Order to be carried in the aircraft;
e) Radio Station Licence;
f) Copy of Load Sheet (Singapore registered aircraft only);
g) Passenger Manifest showing name and place of embarkation and destination;
h) Cargo Manifest;
i) Copy of Certificate of Maintenance Review (Singapore registered aircraft only);
j) Noise Certificate as required by paragraph 51 of the Air Navigation Order.

Note: An 'authorised person' means any person authorised by the Minister either generally or in relation to a particular case or class of cases, and reference to an authorised person include references to the holder for the time being of any office designated by the Minister.

4 CAT II / III OPERATIONS AT AERODROMES

Refer to WSSS AD 2.22 paragraphs 1.1 to 1.7.

5 FRICTION MEASURING DEVICE USED AND FRICTION LEVEL BELOW WHICH THE RUNWAY IS DECLARED SLIPPERY WHEN IT IS WET

5.1 Responsibility

5.1.1 The Changi Airport Group (Singapore) Pte Ltd is responsible for maintaining the civil aerodromes in a satisfactory condition for flight operations.

5.2 Measurement of Runway Surface Friction

5.2.1 The friction of the runway is calibrated periodically by the use of a Surface Friction Tester using self- wetting features on a clean surface at a speed of 95 km/hr. The principle employed in this case is the measurement of the force acting on the measuring wheel along the distance travelled. The equipment provides a continuous register of the mean coefficient of friction values.

5.2.2 Friction tests will be made over the usable length of the runway, by sections of one third of the length, and at approximately 3, 6, and 9 metres each side of the centreline in such manner as to produce mean values for each runway.

5.2.3 Should the friction value fall to 0.34 or less, NOTAM will be promulgated to notify the runway as liable to be slippery when wet.

5.2.4 The following table would be adopted by Changi Airport Group (Singapore) Civil Maintenance when they report the friction values tested on the runways.

Friction Value (from friction test)	Changi Airport Group's Comment on values obtained
> 0.34	Normal
≤ 0.34	May be Slippery when wet (NOTAM would be issued)

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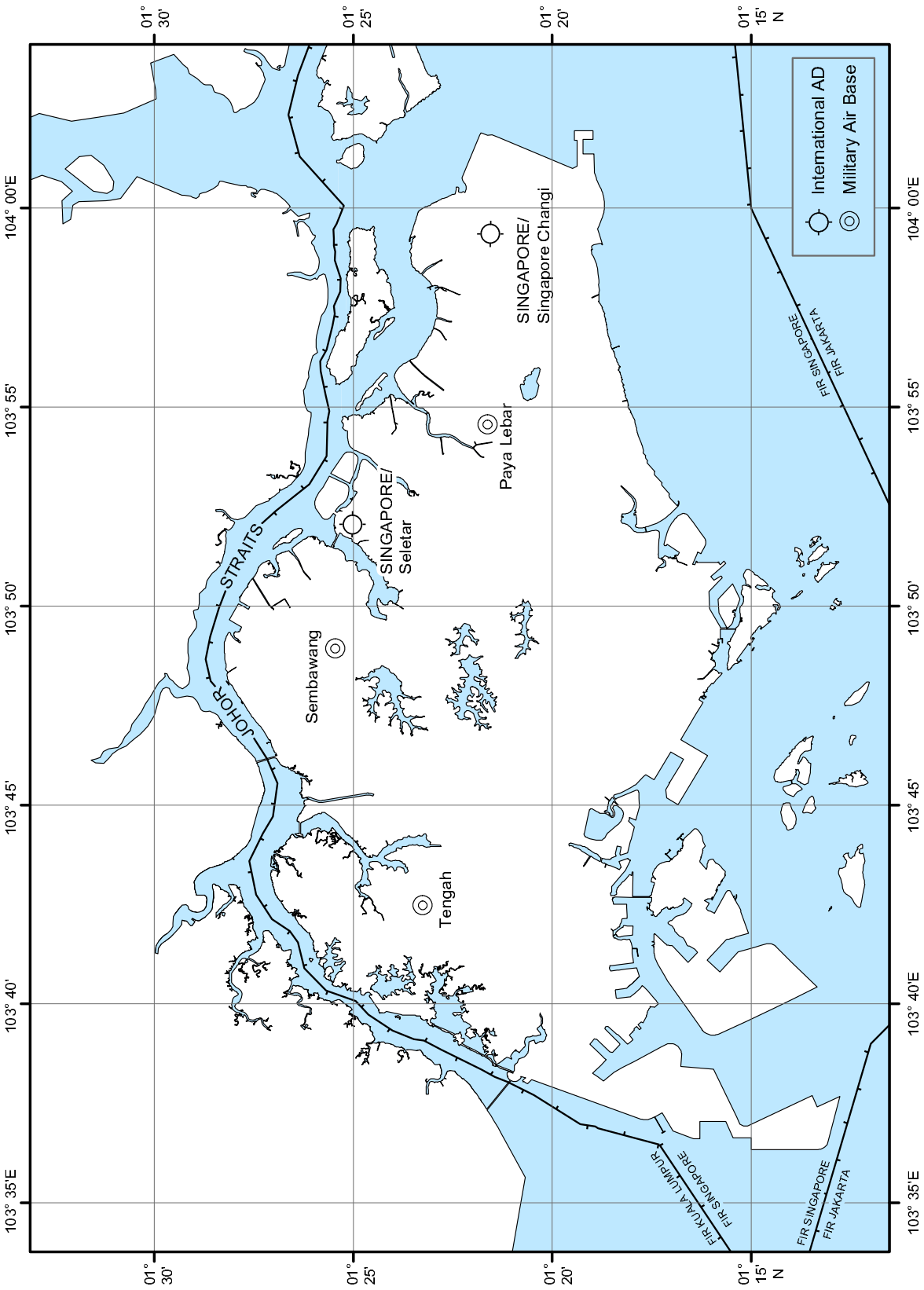
AD 1.3 INDEX TO AERODROMES

Aerodrome name Location indicator	Type of traffic permitted to use the aerodrome			Reference to AD section and remarks
	International (INTL) National (NTL)	IFR-VFR	Scheduled (S) Non-scheduled (NS) Private (P)	
1	2	3	4	5
SINGAPORE / SINGAPORE CHANGI INTL WSSS	INTL	IFR-VFR	S-NS (limited usage)	WSSS AD 2
SINGAPORE / SELETAR WSSL	INTL-NTL	IFR-VFR	NS-P	WSSL AD 2
PAYA LEBAR (Military AD) WSAP	NTL	IFR-VFR		WSAP AD 2
TENGAH (Military AD) WSAT	NTL	IFR-VFR		WSAT AD 2
SEMBAWANG (Military AD) WSAG	NTL	VFR		WSAG AD 2

AERODROME INDEX - CHART



AD 2 AERODROMES

WSSS SINGAPORE / SINGAPORE CHANGI INTL

WSSS AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WSSS - SINGAPORE / SINGAPORE CHANGI INTL

WSSS AD 2.2 AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA

1	*ARP coordinates and site at AD*	01 21 33 N 103 59 22 E (Control Tower)
2	*Direction and distance from (city)*	17.2km North-East from City Centre (The Fullerton Hotel, Singapore)
3	*Elevation/Reference temperature*	6.66m / 32.6 ^{o}C
4	*Geoid Undulation (AD elevation position)*	10.24 M
5	*MAG VAR /Annual change*	0°23' E (2020) / Negligible
6	*AD Administration, address, telephone, telefax, AFS*	
CHANGI AIRPORT GROUP (SINGAPORE) PTE LTD Singapore Changi Airport P.O.Box 168, SINGAPORE 918146 Tel: (65)65956868		
7	*Types of traffic permitted*	IFR and VFR
8	*Remarks*	
a. Not available to all non-scheduled civil aircraft types of 40-seater or below except in special circumstances. Aircraft larger than the above category shall not plan their arrival between 0900-1559UTC. b. Aircraft shall leave nose-in position (90 degrees) with the aid of aircraft tow tractors. Reverse thrust or variable pitch propellers shall not be used. Aircraft operators shall make suitable arrangements. c. Prior permission required for aircraft not equipped with radiotelephony. d. A subsonic jet aircraft, unless otherwise exempted, is not permitted to operate in Singapore unless it possesses a noise certificate stating that it meets the noise standards of ICAO Annex 16, Volume 1, Chapter 3, or equivalent. The noise certificate may also take the form of a suitable statement contained in another document approved by the State of Registry of the aircraft. e. RVR minima for CATII ILS operations is limited to 350m due to runway and taxiway light spacing requirements on the airfield. f. Frangible poles are installed for the purpose of identifying 90m away from the centreline of RWY 02L/20R and RWY 02C/20C		

WSSS AD 2.3 OPERATIONAL HOURS

	Operational Hours		
1	Aerodrome Administration:	RWY 02L/20R RWY 02C/20C RWY 02R/20L	H24
2	Customs and Immigration	H24	
3	Health and Sanitation	H24	
4	AIS Briefing Office	H24	
5	ATS Reporting Office	H24	
6	MET Briefing Office	H24	
7	Air Traffic Services	H24	

WSSS AD 2.4 HANDLING SERVICES AND FACILITIES

1	*Cargo Handling Facilities*	Cargo terminals equipped with advanced storage stacker, material and pallet container handling systems, computerised cargo information, data and documentation systems. By arrangement with airlines.
2	*Fuel / Oil Types*	JET A1(for aircraft). Oils: Various by arrangement with fuel companies.
3	*Fuelling Facilities / Capacity*	Hydrant refueling
4	*Hangar space for visiting aircraft*	By arrangement with SIA Engineering Company (SIAEC) or ST Aerospace Services Co.

5	*Repair facilities for visiting aircraft*	Maintenance and repairs for commercial aircraft up to and including A380 is by arrangement.
6	*Remarks*	a) Marshalling Service: No pilot shall taxi an aircraft on its own into a gate/stand without the aid of a docking system or a marshaller. b) Oxygen and related servicing: Oxygen for all cabin and aircraft system. No CO? recharging facilities.

WSSS AD 2.5 PASSENGER FACILITIES

1	*Hotels*	Transit area and adjacent to airport terminal.
2	*Restaurants*	Transit and public areas of terminal building.
3	*Transportation*	Buses, taxis, MRT train and car rental service.
4	*Medical Facilities*	Available at airport.
5	*Bank and Post Office*	Available at airport.
6	*Tourist Office*	Available at airport.
7	*Remarks*	Internet address: http://www.changiairport.com.sg for airport and flight information, shops and restaurants, facilities and services, flight connections and tourist information.

WSSS AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

1	*AD category for fire fighting*	RWY 02L/20R, RWY 02C/20C and RWY 02R/20L CAT10 (No facilities for foaming of runways)
2	*Rescue equipment*	Adequately provided as recommended by ICAO.
3	*Capability for removal of disabled aircraft*	Specialised aircraft recovery equipment available for up to and including A380 size aircraft operation.
4	*Remarks*	All Airport Emergency Service personnel are trained in rescue and fire-fighting as well as medical first-aid.

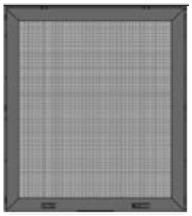
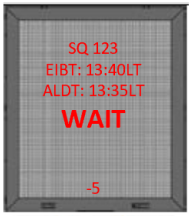
WSSS AD 2.7 SEASONAL AVAILABILITY - CLEARING

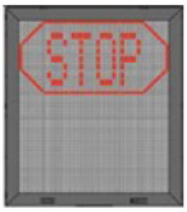
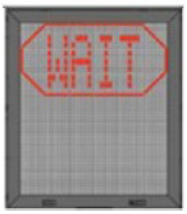
There is no requirement for clearing. The aerodrome is available throughout the year.

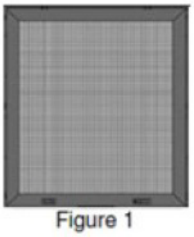
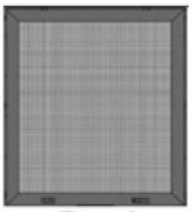
WSSS AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

1	*Apron surface and strength*	Aircraft stands C11, C16, C19, D30, D35, D38, E2, E6, E7, E10, F32, F36, F37, 301, 303, 304, 305, 307, 308, 309, 402, 403, 404, 605, 952, G1 to G17 and 471 to 487 – Concrete surface; strength PCR 680/R/B/W/U Aircraft stand 306 – Concrete surface; strength PCR 784/R/B/W/U All other aircraft stands – Concrete surface; strength PCR 1006/R/B/W/U

1.4 SAFETY MEASURES

Description	Display on ADGS
ADGS Blank / With Pre-arrival Information / Wrong Aircraft Type – Pilot should not turn an aircraft into the aircraft stand if the docking system is not activated (Figure 1) or displaying with pre-arrival information (Figure 2) or on seeing a wrong aircraft type displayed on the system	**Safedock Type 1**  Figure 1 **Safedock FleX**  Figure 1 **Safedock Type 1**  Figure 2 **Safedock FleX**  Figure 2
Proceeding beyond Passenger Loading Bridges – Pilot should not proceed beyond the passenger loading bridges unless the scrolling arrows (see figure 1) have been superseded by the solid yellow closing rate bar (see figure 2).	**Safedock Type 1**  Figure 1  Figure 2 **Safedock FleX**  Figure 1  Figure 2

Description	Display on ADGS
Minimum Speed – When using the docking system, pilots are to taxi into the aircraft stand at minimum speed. The system will display “SLOW” to inform the pilot if the aircraft’s taxiing speed exceeded 1.2m/s.	**Safedock Type 1**  **Safedock FleX** 
Slow Down (In Abnormal Situations) – In bad weather conditions, the docking system may go into downgrade mode. The display will show the aircraft type and “SLOW” and the scrolling arrows are disabled (See Figure 1). When the system has detected the aircraft, the solid yellow closing rate bar appears. Docking process is allowed to continue but pilot should exercise caution.	**Safedock Type 1**  Figure 1 **Safedock FleX**  Figure 1
Overshooting – To avoid overshooting, pilots are advised to approach the stop position slowly and observe the closing rate information displayed. Pilots should stop the aircraft immediately when seeing the “STOP” or “WAIT” display or when given the stop sign by the aircraft marshaller or is unsure of the information displayed during the docking process.	**Safedock Type 1**   **Safedock FleX**  

Description	Display on ADGS
No Display – Pilot should stop the aircraft immediately if the display goes black, for power failure (see figure 1) or system failure (see figure 2), during the docking process. The aircraft is to be manually marshalled into the aircraft stand.	**Safedock Type 1**  Figure 1  Figure 2 **Safedock FleX**  Figure 1  Figure 2
Safety Backup (SBU) Stop - When a non-recoverable error has occurred during the docking due to either 1. Hardware failure; 2. Aircraft more than +/- 0.5 meters off the centerline when two (2) meters or less to stop-position; or 3. System Failure - Pilot are to stop the aircraft immediately when seeing the “SBU STOP” display or when given the stop sign by the aircraft marshaller or is unsure of the information displayed during the docking process.	**Safedock Type 1**  **Safedock FleX** 
View Blocked - When the view towards the aircraft is hindered, the display will show “WAIT VIEW BLOCK” Pilot are to stop the aircraft immediately or when given the stop sign by the aircraft marshaller or is unsure of the information displayed during the docking process.	**Safedock Type 1**  **Safedock FleX** 

Description	Display on ADGS
Gate Block - When an object is found to be blocking the view from the ADGS toward the aircraft, the display will show "WAIT GATE BLOCK". Pilot are to stop the aircraft immediately or when the stop sign by the aircraft marshaller or is unsure of the information displayed during the docking process.	Safedock Type 1  Safedock FleX 

2 PROCEDURES FOR START-UP AND PUSHBACK OF AIRCRAFT

2.1 Ground crew shall ensure that the area behind an aircraft is clear of vehicles, equipment and other obstructions before the start-up or pushback of aircraft commences.

2.2 When it becomes necessary to vary a procedure to expedite aircraft movements, Ground Movement Controller (“Singapore Ground”) shall issue specific instructions to the pilot.

2.3 When the pilot is ready for start-up and pushback, he shall seek confirmation from the ground crew that there is no hazard to his aircraft starting up. He shall then notify Singapore Ground that he is ready for pushback. On being told by Singapore Ground that pushback is approved, he shall co-ordinate with the ground crew for the start-up and pushback of the aircraft.

2.4 The lead-in lines are for aircraft nose-in guidance. For aircraft stands without dedicated pushback lines, ground crew may use the lead-in lines for pushback guidance.

2.5 For more information, refer to Airport Operations Centre System (AOCS) at https://aoc.changiairport.com/ for detailed pushback procedures.

3 ADVANCED MULTILATERATION SYSTEM

3.1 INTRODUCTION

3.1.1 The Multilateration System is a new surveillance system which is able to detect and identify all Mode S equipped aircraft and vehicles moving on the airport surface even during bad weather conditions such as heavy rain. It will integrate with the current radar-based ground surveillance system as part of the Advanced-Surface Movement Guidance and Control System (A-SMGCS) at Singapore Changi Airport. This will enhance the efficiency and safety at the airport.

3.2 CARRIAGE OF MODE-S SSR TRANSPONDER

3.2.1 Carriage and operation of Mode-S transponder is required for all civil aircraft operating at Singapore Changi Airport. The Mode-S transponder shall comply, at least, to the requirements of Level 2 as prescribed in ICAO Annex 10 Volume IV (Amendment 77 or later) Standards and Recommended Practices.

3.3 MULTILATERATION SYSTEM OUTLINE

3.3.1 The Multilateration System uses multiple receivers to pick up “squitters” transmitted by aircraft or vehicle Mode S transponders. It calculates the position of an aircraft or a vehicle by comparing the time its “squitter” arrives at each receiver.

3.3.2 The System will derive the identity of an aircraft by selectively interrogating its transponder to receive its assigned Mode A code or extracting its aircraft identification [that is, the ICAO callsign used in flight and inserted in the Flight Management System (FMS) or the Transponder Control Panel], if available, from its squitter. For transponder equipped vehicles, the system will derive their respective identities from the unique Mode S addresses contained in their squitters.

3.4 AIRCRAFT REQUIREMENTS

3.4.1 The Multilateration System is essentially passive. It relies on aircraft transponders squittering at all times when moving on the airfield. At present, some aircraft checklist procedures instruct pilots to turn off the transponder shortly after leaving the runway on arrival and, not to switch it on until reaching the runway holding point for departure. This is in line with the requirement that Mode A/C transponders should not transmit on the ground, which does not apply to Mode S transmissions.

3.4.2 For the Multilateration System to work effectively, all aircraft Mode S transponders need to transmit Mode S squitters at all times when moving on the airfield, starting immediately prior to the request for pushback, and for arrival aircraft until they are stationary at the aircraft stands. The Mode S transponders should not respond to All-Call interrogations, but should respond to addressed interrogations.

3.5 PROCEDURES/ACTIONS REQUIRED BY PILOTS

3.5.1 The Multilateration System needs to receive squitters and to acquire the Mode A code of a Mode S equipped aircraft at all times when it is on the ground. This is to enable detection and identification of the aircraft (from its Mode A code or ICAO callsign) as soon as pilot initiates the request for pushback. Hence, the following actions from pilots are required.

3.5.2 Pre-Pushback / Taxi

a) Pilots will be required to enter an assigned Mode A code at start-up. This code will be either a discrete or non-discrete code (a conspicuity code, e.g. 1000).
b) Pilots shall ensure that the aircraft transponder is operating (that is, XPNDR or the equivalent according to specific installation, AUTO if available, not OFF or STBY) and the assigned Mode A code is selected prior to the request for pushback or taxi, whichever is earlier.
c) Whenever the aircraft is capable of reporting aircraft identification, the aircraft identification must also be entered prior to the request for pushback or taxi, whichever is earlier, through the FMS or the Transponder Control Panel. Flight crew must use the 3-letter ICAO designator of the operator, followed by flight identification number (for example, BAW123, SIA002).

3.5.3 After Landing

a) Pilots shall ensure that the aircraft transponder is operating (that is, XPNDR or the equivalent according to specific installation, AUTO if available, not OFF or STBY) after landing, and continuously until the aircraft is stationary at the aircraft stand.
b) Pilots shall ensure that the assigned Mode A code is not changed until the aircraft is stationary at the aircraft stand. (The system requires it for identification of the aircraft).

4 AIRFIELD LIGHTING CONTROL SYSTEM (ALCS) AND MARKINGS

4.1 INTRODUCTION

4.1.1 The Advanced Surface Movement Guidance and Control System (A-SMGCS) at Singapore Changi Airport is able to control and monitor the runway and taxiway airfield lights such as the stop bars and green taxiway centreline lights, through the Airfield Lighting Control System. The system is designed to provide pilots with visual guidance while taking off, landing and taxiing during day/night operations and during periods of low visibility. It is controlled by air traffic controllers at Singapore Changi Airport using the A-SMGCS display.

4.2 TAXI INSTRUCTIONS

4.2.1 When the green centreline lights are switched on, ATC will issue verbal instructions to pilots/ airline operators for taxi / tow clearance. The green taxiway centreline lights are provided for guidance. Pilots/ airline operators shall stop at all red stop bar lights.

4.2.2 All green centreline lights on taxiways leading to the runways terminate at the runway holding positions where, by default, red stop bar lights remain on unless deselected by the Runway Controller. When deselected, these stop bar lights will re-activate automatically. Pilots and drivers shall not cross any lighted red stop bar lights.

4.2.3 Pilots and drivers shall enter / cross the runway or taxiway only when both the following conditions are met:
The crew have

a) Received positive ATC clearance to enter / cross the runway or taxiway, and
b) Observed that the red stop-bar lights are turned off.

4.3 INFORMATION AND MANDATORY SIGNS/MARKINGS

4.3.1 When following ATC verbal taxi instructions, pilots are advised to also navigate their taxi route with reference to information and mandatory signs/markings provided at the airport so as to maintain situational awareness of their whereabouts at all times.

WSSS AD 2.10 AERODROME OBSTACLES

1. Obstacles in Approach / TKOF areas

IN APPROACH / TKOF AREAS		
RWY/Area affected	***Obstacles type, ELEV,Markings/LGT***	**Location of Obstacles**
1	2	3

IN APPROACH / TKOF AREAS			
RWY/Area affected		***Obstacles type, ELEV,Markings/LGT***	**Location of Obstacles**
1)	RWY 20R APCH	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 2120m from DTHR RWY 20R.
	RWY 02L TKOF	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 1110m from DER RWY 02L.
2)	RWY 02L/20R APCH RWY 02L/20R TKOF	ILS LLZ co-located with LLZ antennae.	Within the RWY strip.
3)	RWY 20R APCH	Two antennae, HGT 72ft AMSL, marked and LGTD	012311N 1035928E
4)	RWY 20R APCH	Antenna, HGT 88ft AMSL, marked and LGTD	012315N 1035931E
5)	RWY 02L APCH	Antenna, HGT 82ft AMSL, marked and LGTD	012051N 1035827E
6)	RWY 02L APCH	Pole, HGT 128ft AMSL, marked and LGTD	011859N 1035748E
7)	RWY 02L APCH	Pole, HGT 160ft AMSL, marked and LGTD	012058N 1035814E
8)	RWY 02L APCH	Pole, HGT 131ft AMSL, marked and LGTD	012038N 1035848E
9)	RWY 20C APCH	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 2650m from THR RWY 20C.
	RWY 02C TKOF	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 2590m from DER RWY 02C.
10)	RWY 02C APCH RWY 20C TKOF	Trees HGT ranging up to 75ft AMSL	011909.0N 1035849.0E
11)	RWY 02C APCH RWY 20C TKOF	Approach lighting masts HGT ranging up to 35ft AMSL	Within APCH/TKOF
12)	RWY 02C APCH RWY 20C TKOF	ILS LLZ (South), 27ft AMSL, marked	011932.4N 1035901.3E
13)	RWY 02C APCH RWY 20C TKOF	LLZ Hut (South), 31ft AMSL, marked and LGTD	011934.1N 1035856.8E
14)	RWY 02C APCH RWY 20C TKOF	Mast, 62ft AMSL, marked and LGTD	011917.8N 1035901.5E
15)	RWY 20C APCH RWY 02C TKOF	Trees HGT ranging up to 92ft AMSL	012221.0N 1040022.2E
16)	RWY 20C APCH RWY 02C TKOF	Approach lighting masts HGT ranging up to 35ft AMSL	Within APCH/TKOF
17)	RWY 20C APCH RWY 02C TKOF	ILS LLZ (North), 27ft AMSL, marked	012154.8N 1040001.2E
18)	RWY 20C APCH RWY 02C TKOF	LLZ Hut (North), 31ft AMSL, marked and LGTD	012156.3N 1035957.6E
19)	RWY 20C APCH RWY 02C TKOF	Mast, 55ft AMSL, marked and LGTD	012200.4N 1040012.0E
20)	RWY 20L APCH	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 2190m from THR RWY 20L.
	RWY 02R TKOF	Mast HGT ranging from 98ft AMSL and above.	Shipping channel APRX 2130m from DER RWY 02R.
21)	RWY 02R APCH RWY 20L TKOF	ILS LLZ (South), 26ft AMSL	011909.5N 1035954.7E
22)	RWY 02R APCH RWY 20L TKOF	LLZ Building (South), 27ft AMSL	Within Approach
23)	RWY 02R APCH RWY 20L TKOF	MM Building (South), 27ft AMSL	Within Approach / Takeoff
24)	RWY 20L APCH RWY 02R TKOF	ILS LLZ (North), 26ft AMSL	012131.5N 1040054.7E
25)	RWY 20L APCH RWY 02R TKOF	LLZ Building (North), 28ft AMSL	Within Approach

IN APPROACH / TKOF AREAS			
RWY/Area affected		***Obstacles type, ELEV,Markings/LGT***	**Location of Obstacles**
26)	RWY 20L APCH RWY 02R TKOF	MM Building (North), 27ft AMSL	Within Approach / Takeoff
Remarks: Obstacles are shown on the AOC, IAC and VAC.			

2. Obstacles in Circling area and at Aerodrome

IN CIRCLING AREA AND AT AERODROME		
Obstacles type, ELEV, Markings/LGT		Location of Obstacles
1		2
1)	RWY 02L/20R and RWY 02R/20L Wind direction indicators, marked and LGTD	Located at each end of RWY adjacent to GP Hut
2)	RWY 02C Wind direction indicator, 38ft AMSL, marked and LGTD	011954.7N 1035915.2E
3)	RWY 20C Wind direction indicator, 38ft AMSL, marked and LGTD	012124.9N 1035953.4E
4)	RWY 02L Anemometer, 48ft AMSL, marked and LGTD	012110.5N 1035840.2E
5)	RWY 20R Anemometer, 44ft AMSL, marked and LGTD	012222.7N 1035910.9E
6)	RWY 02C Anemometer, 49ft AMSL, marked and LGTD	011954.3N 1035914.9E
7)	RWY 20C Anemometer, 49ft AMSL, marked and LGTD	012043.4N 1035935.7E
8)	RWY 20C Anemometer, 49ft AMSL, marked and LGTD	012129.4N 1035955.1E
9)	RWY 02R Anemometer, 47ft AMSL, marked and LGTD	012105.7N 1040048.5E
10)	RWY 20L Anemometer, 48ft AMSL, marked and LGTD	011931.7N 1040008.8E
11)	RWY 02L GP Antenna, 67ft AMSL, marked and LGTD	012108.5N 1035839.1E
12)	RWY 20R GP Antenna, 67ft AMSL, marked and LGTD	012225.5N 1035912.2E
13)	RWY 02C GP Antenna, 67ft AMSL, marked and LGTD	011952.2N 1035913.7E
14)	RWY 20C GP Antenna, 67ft AMSL, marked and LGTD	012131.7N 1035955.7E
15)	RWY 02R GP Antenna, 67ft AMSL, marked and LGTD	012108.9N 1040049.4E
16)	RWY 20L GP Antenna, 67ft AMSL, marked and LGTD	011929.1N 1040007.3E
17)	Antenna, HGT 82ft AMSL, marked and LGTD	012036N 1035819E
18)	Antenna, HGT 85ft AMSL, marked and LGTD	012039N 1035821E
19)	Antenna, HGT 78ft AMSL, marked and LGTD	012042N 1035823E
20)	Antenna, HGT 82ft AMSL, marked and LGTD	012053N 1035827E
21)	Antenna, HGT 78ft AMSL, marked and LGTD	012049N 1035826E
22)	FOD detection mast, HGT 46ft AMSL, marked and LGTD	011952.5N 1035913.9E
23)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	011959.1N 1035917.2E
24)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012005.0N 1035919.6E
25)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012016.9N 1035924.7E
26)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012028.7N 1035929.7E
27)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012033.8N 1035931.8E
28)	FOD detection mast, HGT 38ft AMSL, marked and LGTD	012045.5N 1035936.8E
29)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012056.5N 1035941.5E
30)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012108.7N 1035946.6E
31)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012114.0N 1035948.8E
32)	FOD detection mast, HGT 37ft AMSL, marked and LGTD	012124.0N 1035953.1E
33)	FOD detection mast, HGT 38ft AMSL, marked and LGTD	012129.0N 1035954.9E
34)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	011929.5N 1040007.5E
35)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	011934.4N 1040009.8E
36)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	011943.2N 1040013.6E
37)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	011954.2N 1040018.2E

IN CIRCLING AREA AND AT AERODROME		
Obstacles type, ELEV, Markings/LGT		Location of Obstacles
38)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012003.3N 1040022.0E
39)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012004.5N 1040022.5E
40)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012027.2N 1040031.8E
41)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012027.8N 1040032.0E
42)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012052.8N 1040042.9E
43)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012054.9N 1040043.8E
44)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012103.4N 1040047.4E
45)	FOD detection mast, HGT 45ft AMSL, marked and LGTD	012108.4N 1040049.3E
46)	Liquefied Natural Gas storage tanks, plants, gas stacks and flares within Malaysia's Pengerang Integrated Complex (PIC) extending up to HGT 1,500ft AMSL. Refer to AIP Malaysia for information on "Pengerang Integrated Complex Safety Area". Aircraft may overfly the area at 2,000ft and above.	Within area bounded by 012245N 1040705E 012245N 1040831E 012306N 1040954E 012301N 1041056E 012232N 1041058E 012114N 1041057E 012038N 1040939E 012031N 1040813E 012136N 1040704E 012245N 1040705E
Remarks: Obstacles are shown on the AOC, IAC and VAC.		

WSSS AD 2.11 METEOROLOGICAL INFORMATION PROVIDED

1	*Associated MET Office*	Singapore Changi (WSSS)
2	*Hours of service*	H24
3	*Office responsible for TAF preparation* *Periods of validity*	Singapore Changi (WSSS) 12, 30
4	*Type of landing forecast, Interval of issuance*	TREND
5	*Briefing/consultation provided*	P
6	*Flight documentation, Language used*	Charts or Tabular forms, English
7	*Charts and other information available for briefing or consultation*	S, U, P
8	*Supplementary equipment available for providing information*	HRPT: High Resolution Picture Transmission APT: Automatic Picture Transmission MDWR: MET Doppler Weather Radar MAINT: Second WED of every month BTN 0200-0900 ALTN period: THU following the second WED.
9	*ATS units provided with information*	Singapore ACC, Singapore RCC
10	*Additional information*	Tel: 65422837 (MET Office)

WSSS AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

Designations RWY NR	TRUE BRG	Dimensions of RWY	Strength (PCR) and surface of RWY and SWY	THR coordinates and RWY end coordinates (THR Geoid Undulation)	THR Elevation and highest elevation of TDZ of precision APCHRWY
1	2	3	4	5	6
02L	023.02°	4000m X 60m	710/F/B/X/U Grooved Bituminous Concrete	THR coordinates: 012056.27N 1035838.82E RWY end coordinates: 012256.13N 1035929.42E (10.23m)	6.64m 6.64m
20R (Threshold displaced by 740m southwards)	203.02°	4000m X 60m	710/F/B/X/U Grooved Bituminous Concrete	THR coordinates: 012234.02N 1035920.09E RWY end coordinates: 012056.27N 1035838.82E (10.26m)	3.98m 4.67m
02C	023.01°	4000m X 60m	710/F/B/X/U Grooved Bituminous Concrete	THR coordinates: 011943.51N 1035905.86E RWY end coordinates: 012143.37N 1035956.46E (10.27m)	4.80m 4.80m
20C	203.01°	4000m X 60m	710/F/B/X/U Grooved Bituminous Concrete	THR coordinates: 012143.37N 1035956.46E RWY end coordinates: 011943.51N 1035905.86E (10.30m)	4.80m 4.80m
02R	023.01°	4000m X 60m	710/F/B/X/U Grooved Bituminous Concrete	THR coordinates: 011920.59N 1035959.45E RWY end coordinates: 012120.45N 1040050.05E (10.32m)	4.77m 4.77m
20L	203.01°	4000m X 60m	710/F/B/X/U Grooved Bituminous Concrete	THR coordinates: 012120.45N 1040050.05E RWY end coordinates: 011920.59N 1035959.45E (10.36m)	4.71m 4.75m

Slope of RWY-SWY Transverse/ Longitudinal	SWY Dimensions (m)	CWY Dimensions (m)	STRIP dimensions (m)	Dimensions of RESA (m)	Locations and description of ARST system	OFZ
7	8	9	10	11	12	13
RWY 02L 1.15% / 0.07% SWY 1.44% / 0.23%	60 X 60	270 X 150	4250 X 280	240 X 150	Not Applicable	Yes

Slope of RWY-SWY Transverse/ Longitudinal	SWY Dimensions (m)	CWY Dimensions (m)	STRIP dimensions (m)	Dimensions of RESA (m)	Locations and description of ARST system	OFZ
7	8	9	10	11	12	13
RWY 20R 1.15% / 0.07% SWY 0.74% / 0.28%	60 X 60	270 X 150	4240 X 280	240 X 150	Not Applicable	Yes
RWY 02C 1.25% / 0.00% SWY 1.25% / 0.00%	60 X 60	60 X 150	4240 X 280	240 X 150	Not Applicable	Yes
RWY 20C 1.25% / 0.00% SWY 1.25% / 0.00%	60 X 60	60 X 150	4240 X 280	240 X 150	Not Applicable	Yes
RWY 02R 1.25% / 0% SWY 1.21% / 0%	60 X 60	60 X 150	4240 X 280	240 X 150	Not Applicable	Yes
RWY 20L 1.25% / 0% SWY 1.22% / 0%	60 X 60	60 X 150	4240 X 280	240 X 150	Not Applicable	Yes

Remarks
14
1) Open-air drains, demarcated by frangible poles, within the runway strip of RWY 02R/20L. 2) Not in use military hookwire system embedded in runway pavement at 490m from RWY 02R and RWY 20L thresholds. 3) Frangible End Around Taxiway (EAT) visual screens located at the approach/take-off end of RWY 02C and RWY 20C do not penetrate the obstacle limitation surfaces of RWY 02C/20C. The EAT visual screens are marked in diagonal red-white stripes and installed with additional red obstacle lights. The EAT visual screens are intended to help pilots operating on RWY 02C/20C to differentiate between an aircraft crossing the runway or taxiing on end-around taxiways TWY K and TWY L. 4) **Scheduled Closure of RWY 02L/20R** a) BTN 1700-2100UTC on every SUN and WED of the month (preventive maintenance work). In the event of emergency, RWY will be re-opened within 30 minutes. b) A 5-minute inspection conducted within the periods BTN 0100-0359UTC 0500-0759UTC 0800-1059UTC daily. 5) **Scheduled Closure of RWY 02C/20C** a) BTN 1700-2100UTC on every MON of the month (preventive maintenance work). In the event of emergency, RWY will be re-opened within 30 minutes. b) A 5-minute inspection conducted within the periods BTN 0100-0359UTC 0500-0759UTC 0800-1059UTC daily. 6) **Scheduled Closure of RWY 02R/20L** a) BTN 1700-2100UTC on every TUES and FRI of the month (preventive maintenance work). In the event of emergency, RWY will be re-opened within 30 minutes. b) A 5-minute inspection conducted within the periods BTN 0100-0359UTC 0500-0759UTC 0800-1059UTC daily. 7) **Additional Inspection and Maintenance Closures** a) On days when there is a scheduled 4-hour runway closure BTN 1700-2100UTC I. 10-minute inspection conducted within the period BTN 1500-1610UTC on the operational runway(s); II. 15-minute inspection conducted within the period BTN 1200-2359UTC on the operational runway(s); III. 5-minute inspection conducted within the period BTN 1200-1259UTC on the re-opened runway. b) On days when there is no scheduled 4-hour runway closure BTN 1700-2100UTC I. RWY 02L/20R i. 5-minute inspection conducted BTN 2300-2305UTC ii. 30-minute maintenance will be conducted BTN 1830-1900UTC II. RWY 02C/20C i. 5-minute inspection conducted BTN 2315-2320UTC ii. 60-minute maintenance will be conducted BTN 2000-2100UTC III. RWY 02R/20L i. 5-minute inspection conducted BTN 2330-2335UTC ii. 60-minute maintenance will be conducted BTN 2100-2130UTC

WSSS AD 2.13 DECLARED DISTANCES

RWY Designator	Intersection Departures	TORA (m)	TODA (m)	ASDA (m)	LDA (m)	Remarks
1	2	3	4	5	6	7
20R	Not applicable	4000	4270	4060	3260	THR displaced by 740m southwards
	W2	3842	4112	3902	Not applicable	
	W3	3026	3296	3086	Not applicable	
02L	Not applicable	4000	4270	4060	4000	NIL
	W8	3842	4112	3902	Not applicable	
	W7	3026	3296	3086	Not applicable	

RWY Designator	Intersection Departures	TORA (m)	TODA (m)	ASDA (m)	LDA (m)	Remarks
1	2	3	4	5	6	7
20C	Not applicable	4000	4060	4060	4000	NIL
	T3	3808	3868	3868	Not applicable	
	T4	3421	3481	3481	Not applicable	
	T5	2721	2781	2781	Not applicable	
	D3	3842	3902	3902	Not applicable	
	D4	3502	3562	3562	Not applicable	
	D5	3027	3087	3087	Not applicable	
	D6	2552	2612	2612	Not applicable	
02C	Not applicable	4000	4060	4060	4000	NIL
	T11	3842	3902	3902	Not applicable	
	T10	3329	3389	3389	Not applicable	
	T9	3197	3257	3257	Not applicable	
	T8	2551	2611	2611	Not applicable	
	D12	3842	3902	3902	Not applicable	
	D11	3480	3540	3540	Not applicable	
	D10	2877	2937	2937	Not applicable	
	D9	2402	2462	2462	Not applicable	
20L	Not applicable	4000	4060	4060	4000	NIL
	A3	3842	3902	3902	Not applicable	
	A4	3027	3087	3087	Not applicable	
	A5	2552	2612	2612	Not applicable	
02R	Not applicable	4000	4060	4060	4000	NIL
	A10	3842	3902	3902	Not applicable	
	A9	2877	2937	2937	Not applicable	
	A8	2402	2462	2462	Not applicable	

Note: Intersection departures are allowed subject to the following:

a) initiated by pilot and approved by ATC, traffic permitting.
b) ATC is able to keep aircraft visual at all times

WSSS AD 2.14 APPROACH AND RUNWAY LIGHTING

RWY	APCH LGT Type, LEN, Intensity	THR LGT colour WBAR	PAPI (MEHT)	TDZ LGT LEN	RWY Centreline LGT, LEN, spacing, colour, INTST	RWY Edge LGT, LEN, spacing, colour, INTST	RWY End LGT colour	SWY LGT colour
1	2	3	4	5	6	7	8	9
02L	CAT II High Intensity approach lighting (900m) consisting of extended centreline and RED row barrettes, 2 crossbars, 2 approach beacons and sequenced flashing lights.	GREEN supplemented by Green wing-bar and 2 THR ident lights.	PAPI 003° located either side of RWY, 422m behind RWY THR. 2 WHITE LGT and 2 RED LGT (20.0m), 3 WHITE LGT and 1 RED LGT (24.0m), 4 WHITE LGT (26.4m). ACFT with eye-to-wheel height greater than 8m are advised to fly with 2 WHITE and 2 RED LGT visible so as to achieve sufficient wheel clearance.	WHITE	Inset High Intensity centreline lights (longitudinal spacing at 30m apart) as follows: From THR to 900m from RWY end: WHITE, 300m to 900m from RWY end: ALTN RED/ WHITE, 300m to RWY end: RED.	Bi-directional White/Amber edge lights (longitudinal spacing at 60m apart) as follows: From THR to 600m from RWY end: White, 600m to RWY end: Amber.	RED	RED
20R	CAT1 High Intensity approach lighting (900m) distance coded centreline lights showing variable WHITE and crossbars at 150m, 300m, 450m, 600m and 750m.	GREEN supplemented by Green wing-bar and 2 THR ident lights.	PAPI 003° located either side of RWY, 410m from THR. 2 WHITE LGT and 2 RED LGT (19.5m), 3 White LGT and 1 RED LGT (23.3m), 4 WHITE LGT (25.7m). ACFT with eye-to-wheel height greater than 8m are advised to fly with 2 WHITE and 2 RED LGT visible so as to achieve sufficient wheel clearance.	NIL	Inset High Intensity centreline lights (longitudinal spacing at 30m apart) as follows: From THR to 900m from RWY end: WHITE, 300m to 900m from RWY end: ALTN RED/ WHITE, 300m to RWY end: RED.	RED RWY edge lights (longitudinal spacing at 60m apart) in the direction of RWY 20R before the displaced THR. Bi-directional raised WHITE/ AMBER edge lights (longitudinal spacing at 60m apart) after the displaced THR.	RED	Elevated RED

RWY	APCH LGT Type, LEN, Intensity	THR LGT colour WBAR	PAPI (MEHT)	TDZ LGT LEN	RWY Centreline LGT, LEN, spacing, colour, INTST	RWY Edge LGT, LEN, spacing, colour, INTST	RWY End LGT colour	SWY LGT colour
1	2	3	4	5	6	7	8	9
02C	CAT II High Intensity approach lighting (900m) consisting of extended centreline and RED row barrettes , 2 crossbars, 2 approach beacons and sequenced flashing lights.	Green supplemented by green wing-bar and 2 THR ident lights.	PAPI 003° located either side of RWY, 418m from THR. 2 WHITE LGT and 2 RED LGT (19.8m), 3 WHITE LGT and 1 RED LGT (23.7m), 4 WHITE LGT (26.2m). ACFT with eye-to-wheel height greater than 8m are advised to fly with 2 WHITE and 2 RED LGT visible so as to achieve sufficient wheel clearance.	WHITE. 900m (From THR) TDZ. Every 60m from THR.	Inset High Intensity centreline lights as follows: From THR to 900m from RWY end: WHITE, 300m to 900m from RWY end: ALTN RED/ WHITE, 300m to RWY end: RED.	Bi-directional WHITE/ AMBER edge lights as follows: From THR to 600m from RWY end: White, 600m to RWY end: Amber.	RED	RED
20C	CAT II High Intensity approach lighting (900m) consisting of extended centreline and RED row barrettes, 2 crossbars, 2 approach beacons and sequenced flashing lights.	Green supplemented by green wing-bar and 2 THR ident lights.	PAPI 003° located on left side of RWY, 418m from THR. 2 WHITE LGT and 2 RED LGT (19.8m), 3 WHITE LGT and 1 RED LGT (23.7m), 4 WHITE LGT (26.2m). ACFT with eye-to-wheel height greater than 8m are advised to fly with 2 WHITE and 2 RED LGT visible so as to achieve sufficient wheel clearance.	WHITE 900m (From THR) TDZ. Every 60m from THR.	Inset High Intensity centreline lights as follows: From THR to 900m from RWY end: WHITE, 300m to 900m from RWY end: ALTN RED/WHITE, 300m to RWY end: RED.	Bi-directional WHITE/ AMBER edge lights as follows: From THR to 600m from RWY end: White, 600m to RWY end: Amber.	RED	RED

RWY	APCH LGT Type, LEN, Intensity	THR LGT colour WBAR	PAPI (MEHT)	TDZ LGT LEN	RWY Centreline LGT, LEN, spacing, colour, INTST	RWY Edge LGT, LEN, spacing, colour, INTST	RWY End LGT colour	SWY LGT colour
1	2	3	4	5	6	7	8	9
02R	CAT II High Intensity Approach Lights (900m) consisting of extended centreline and Red row barrettes, 2 crossbars, 2 approach beacons and sequenced flashing lights.	Green supplemented by green wing-bar and 2 THR ident lights.	PAPI 003° located either side of RWY, 415m from THR. 2 White lights and 2 Red lights (19.7m), 3 White lights and 1 Red light (23.6m), 4 White lights (26.0m). ACFT with eye-to- wheel height greater than 8m are advised to fly with 2 White and 2 Red lights visible so as to achieve sufficient wheel clearance.	White. 900m (From THR) TDZ. Every 60m from THR.	Inset High Intensity centreline lights (longitudinal spacing at 30m apart) as follows: From THR to 900m from RWY end: White, 300m to 900m from RWY end: ALTN Red/ White, 300m to RWY end: Red.	Bi-directional White/Amber edge lights (longitudinal spacing at 60m apart) as follows: From THR to 600m from RWY end: White, 600m to RWY end: Amber.	Red	Red
20L	CAT II High Intensity Approach Lights (900m) consisting of extended centreline and Red row barrettes, 2 crossbars, 2 approach beacons and sequenced flashing lights.	Green supplemented by green wing-bar and 2 THR ident lights.	PAPI 003° located either side of RWY, 415m from THR. 2 White lights and 2 Red lights (19.7m), 3 White lights and 1 Red light (23.6m), 4 White lights (26.0m). ACFT with eye-to- wheel height greater than 8m are advised to fly with 2 White and 2 Red lights visible so as to achieve sufficient wheel clearance.	White. 900m (From THR) TDZ. Every 60m from THR.	Inset High Intensity centreline lights (longitudinal spacing at 30m apart) as follows: From THR to 900m from RWY end: White, 300m to 900m from RWY end: ALTN Red/ White, 300m to RWY end: Red.	Bi-directional White/Amber edge lights (longitudinal spacing at 60m apart) as follows: From THR to 600m from RWY end: White, 600m to RWY end: Amber.	Red	Red

WSSS AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

1	*ABN/IBN location, characteristics and hours of operation*	ABN: 012209.20N 1035858.43E (western side of RWY 02L/20R) ALTN FLG W G EV 2.3 SEC, Operating hours HN + IMC IBN: 012301.27N 1035959.49E (top of Cargo Agents Building E) FLG G 'SS' EV 7 SEC, Operating hours HN + IMC

2	*Anemometer location and LGT*	RWY 02L/20R: Pressure tube anemometer and wind vane situated 345m west of middle of the runway. Cup anemometers and wind vanes at ends and middle of the runway. Windsocks at ends of the runway. Transmissometers at both ends and in the middle of the runway. RWY 02C/20C: Three ultrasonic wind sensors at the ends and middle of the runway. Windsocks at the ends of the runway. Transmissometers at both ends and in the middle of the runway. RWY 02R/20L: Three ultrasonic wind sensors at the ends and middle of the runway. Windsocks at the ends of the runway. Transmissometers at both ends and in the middle of the runway.
3	*TWY Edge and Centreline Lighting*	RWY 02L/20R and RWY 02C/20C: BLUE lights on TWY curved edges and apron TWY edges and GREEN centreline lights on all TWY. RWY 02R/20L: Blue lights on TWY curved edges and Green centreline lights on all TWY.
4	*Secondary power supply/switch-over time*	Automatic standby generator power supply AVBL for airfield lighting with switchover time of 1 second during Category II low visibility operations.
5	*Remarks*	Vehicles painted yellow or displaying chequered red/white or orange/white flag at highest point of vehicle

WSSS AD 2.16 HELICOPTER LANDING AREA

Refer to ENR 3.4

WSSS AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	**CHANGI CTR** 013300N 1040149E 013042N 1040654E 012542N 1040448E thence along Kuala Lumpur/ Singapore FIR BDRY to 012000N 1041218E 010018N 1035524E 011100N 1035134E 013300N 1040149E
2	*Vertical Limits*	SFC to 3,000ft ALT
3	*Airspace Classification*	C
4	*ATS Unit Callsign* *Language(s)*	Singapore Tower English
5	*Transition Altitude*	11000 FT (3,350m)
6	*Remarks*	A helicopter shall not be operated within the Changi CTR unless prior permission has been obtained from the Director-General of Civil Aviation, CAAS. Email to caas_ats_ansp@caas.gov.sg

WSSS AD 2.18 ATS COMMUNICATION FACILITIES

Service Designation	Call sign	*Frequency (P-Pri, S-Sec)*	Hours of operation	Remarks
APP	Singapore Departure	P120.3 MHz S133.0 MHz S132.15 MHz	H24	DEP from all airports in Singapore.
	Singapore Arrival	P119.3 MHz S119.4 MHz S119.55 MHz		TAR - Intermediate and final approach to Singapore Changi AP.
	Singapore Approach	P124.05 MHz S124.6 MHz S126.3 MHz	2100-1700	TAR - flow control service provided for ARR/DEP ACFT. Intermediate approach to Singapore Changi AP and other airports in Singapore.

Service Designation	Call sign	*Frequency (P-Pri, S-Sec)*	Hours of operation	Remarks
TWR	Singapore Tower	118.6 MHz	H24	for TKOF/LDG. for ACFT operating on RWY 02L/20R for vehicular movements on RWY 02L/20R
		118.25 MHz		for ACFT operating on RWY 02C/20C for vehicular movements on RWY 02C/20C for ground movement of ACFT (including ACFT on tow) north and south of RWY 02C/20C
		131.4 MHz		for ACFT operating on RWY 02R/20L for vehicular movements on RWY 02R/20L
	Singapore Ground	124.3 MHz	0000-1800 2100- 0000	for push-back / taxiing of all ACFT, including ACFT on tow, west of Terminal 3
		121.725 MHz	0000-1700 2100-0000	for push-back / taxiing of all ACFT (including ACFT on tow) east of Terminal 2 and west of TWY B (excluding TWY J8, J9, J10 and J12)
		121.85 MHz	0000-1600	for push-back / taxiing of all ACFT including ACFT on tow, north of Terminal 1
			1600- 0000	for push-back/ taxiing of all ACFT
		121.00 MHz	H24	for ground emergency
		122.55 MHz		for push-back / taxiing of all ACFT (including ACFT on tow) east of Terminal 4
		125.65 MHz		for push-back / taxiing of all ACFT (including ACFT on tow) west of Terminal 4
		127.275 MHz		for taxiing of all ACFT (including ACFT on tow) west of RWY 02R/20L
	Singapore Delivery	121.65 MHz	H24	for Pre-flight check/ATC clearance
		119.6 MHz	0030-0230 1200-1300	for issuance of ATC clearance

Service Designation	Call sign	*Frequency (P-Pri, S-Sec)*	Hours of operation	Remarks
TWR	Changi Tower / Changi Apron	121.9MHz	H24	Requests for engine runs on aprons and taxiways, excluding runways, would be regulated by Changi Apron. All towing request to contact Changi Apron followed by instruction to contact respective Singapore Ground frequency for towing clearance. Request for vehicular movements on taxiways, excluding runways, would be regulated by Changi Tower. For ACFT on tow and vehicular movements on the runway when the runway is closed for maintenance. All personnel operating the radio station on board an ACFT that is on the ground in Changi Airport should possess the Aircraft Radio Operator Approval (AROA) or other equivalent certification.
	Changi East Tower	119.675MHz	H24	Request for vehicular movements on taxiways, excluding runway, west of RWY 02R/20L and east of TWY C will be regulated by Changi East Tower. For ACFT on tow and vehicular movements on RWY 02R/20L when the runway is closed for maintenance. All personnel operating the radio station on board an ACFT that is on the ground in Changi Airport should possess the Aircraft Radio Operator Approval (AROA) or other equivalent certification.
	Changi East Ground	120.95MHz	Not for use, unless with prior coordination	For start-up / taxiing of all aircraft
D-ATIS	Changi Airport Departure Information	128.6MHz	H24	(broadcasting with half hourly updated MET INFO)
	Changi Airport Arrival Information	128.025MHz	H24	Data Link Service available. AP IDENT WSSS Messages comply with ARINC 623 Standards. Updating of data: H+00 to H+10 and H+30 to H+40
ATIS	Changi East Information (02R/ 20L)	139.95MHz	Not for use, unless with prior coordination	NIL

WSSS AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of aid and Variation	IDENT	Frequency	OPR Hour	Position of Transmitting Antenna Coordinates	DME Transmitting Antenna Elevation / Remarks
1	2	3	4	5	6 & 7
SINJON DVOR/DME	SJ	113.5MHz CH82X	H24	011321.34N 1035115.22E	201° MAG 14.5km from THR RWY 02 (Paya Lebar). Antenna HGT: 190ft AMSL. Coverage 200NM. EM: F1. Maintenance period: Third Thursday of every month between 0200-0600

Type of aid and Variation	IDENT	Frequency	OPR Hour	Position of Transmitting Antenna Coordinates	DME Transmitting Antenna Elevation / Remarks
1	2	3	4	5	6 & 7
TEKONG DVOR/DME	VTK	116.5MHz CH112X	H24	012455.36N 1040120.17E	023° MAG 6.4km from THR RWY 20C (Singapore Changi). Antenna HGT: 150ft AMSL. Coverage 200NM. EM: F1 Maintenance Period: Third Friday of every month between 0200-0600
RWY 20C ILS LLZ	ICC	109.7MHz	H24	011932.40N 1035901.32E	Located 368m (1207ft) from THR RWY 02C, along RWY centreline. Course width 2.80°. EM: A0/A2.
RWY 20C ILS GP	-	333.2MHz	H24	012131.73 1035955.71E	Located 338m (1109ft) from THR RWY 20C on left side of RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS Reference Datum: 16.2m (53ft). EM: A0/A2.
RWY 20C ILS_DME	ICC	CH34X	H24	012131.73N 1035955.71E	DME co-located with GP. EM: P9.
RWY 20C ILS MM	-	75MHz	H24	012212.24N 1040008.87E	Located 964m (3162ft) from THR RWY 20C along extended centreline of RWY. No back beam.
RWY 02C ILS LLZ	ICE	108.3MHz	H24	012154.47N 1040001.18E	Located 368m (1207ft) from THR RWY 20C, along RWY centreline. Course width 2.80°. EM: A0/A2.
RWY 02C ILS GP	-	334.1MHz	H24	011952.18N 1035913.68E	Located 338m (1109ft) from THR RWY 02C on right side of RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS Reference Datum: 16.5m (54ft). EM: A0/A2.
RWY 02C ILS_DME	ICE	CH20X	H24	011952.18N 1035913.68E	DME co-located with GP. EM: P9.
RWY 02C ILS MM	-	75MHz	H24	011914.72N 1035853.19E	Located 966m (3169ft) from THR RWY 02C along extended centreline of RWY. No back beam.
RWY 20R ILS LLZ	ICH	108.9MHz	H24	012045.23N 1035834.17E	Located 368m (1207ft) from THR RWY 02L, along centreline of the RWY. Course width 3.38°. EM: A0/A2.
RWY 20R ILS GP	-	329.3MHz	H24	012225.59N 1035912.29E	Located 330m (1083ft) from displaced THR RWY 20R on right side of the RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS Reference Datum: 17m (56ft). EM: A0/A2.
RWY 20R ILS_DME	ICH	CH26X	H24	012225.59N 1035912.29E	DME co-located with GP. RWY 20R ILS DME not available beyond 15 degrees west of RWY 20R centreline below 2500ft. EM: P9.
RWY 20R ILS MM	-	75MHz	H24	012307.51N 1035934.24E	Located 1122m (3681ft) from displaced THR RWY 20R, along centreline of the RWY.
RWY 02L ILS LLZ	ICW	110.9MHz	H24	012307.03N 1035934.03E	Located 1105m (3625ft) from displaced THR RWY 20R, along centreline of RWY. Course width 2.81°. EM:A0/A2.

Type of aid and Variation	IDENT	Frequency	OPR Hour	Position of Transmitting Antenna Coordinates	DME Transmitting Antenna Elevation / Remarks
1	2	3	4	5	6 & 7
RWY 02L ILS GP	-	330.8 MHz	H24	01 21 08 N 103 58 39 E	Located 343m (1125ft) from THR RWY 02L on left side of RWY, 143m (469ft) from RWY centreline. GP angle 3°. HGT of ILS Reference Datum: 17m (56ft). EM:A0/A2.
RWY 02L ILS_DME	ICW	CH46X	H24	012108.35N 1035838.86E	DME co-located with GP. EM:P9.
RWY 02L ILS MM	-	75MHz	H24	012027.54N 1035826.68E	Located 957m (3140ft) from THR RWY 02L along extended centreline of RWY. No back beam.
RWY 20L ILS LLZ	ICZ	108.55MHz	H24	011909.54N 1035954.79E	Located 367m (1204ft) from THR RWY 02R, along RWY centreline. Course width 2.80°. EM: A0/A2.
RWY 20L ILS GP	-	329.75MHz	H24	012108.89N 1040049.38E	Located 335m (1099ft) from THR RWY 20L on left side of the RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS REF datum: 16.8m (55ft). EM: A0/A2.
RWY 20L ILS DME	ICZ	CH22Y	H24	012108.89N 1040049.38E	DME co-located with GP. EM: P9.
RWY 20L ILS MM	-	75MHz	H24	012149.37N 1040102.55E	Located 968m (3176ft) from THR RWY 20L, along extended centreline of the RWY.
RWY 02R ILS LLZ	ICX	110.5MHz	H24	012131.46N 1040054.70E	Located 367m (1204ft) from THR RWY 20L, along RWY centreline. Course width 2.80°. EM: A0/A2.
RWY 02R ILS GP	-	329.6MHz	H24	011929.11N 1040007.26E	Located 335m (1099ft) from THR RWY 02R on right side of the RWY, 120m (394ft) from RWY centreline. GP angle 3°. HGT of ILS REF datum: 16.2m (53ft). EM: A0/A2.
RWY 02R ILS DME	ICX	CH42X	H24	011929.11N 1040007.26E	DME co-located with GP EM: P9
RWY 02R ILS MM	-	75MHz	H24	011851.60N 1035947.22E	Located 974m (3196ft) from THR RWY 02R, along extended centreline of the RWY.

WSSS AD 2.20 LOCAL AERODROME REGULATIONS

1 DESIGNATION OF PAYA LEBAR AIRPORT AS AN ALTERNATE AERODROME FOR SINGAPORE CHANGI AIRPORT

Please refer to section WSAP AD 2.20 for details.

2 WRONG APPROACHES AND LANDINGS OF AIRCRAFT BOUND FOR SINGAPORE CHANGI AND PAYA LEBAR AIRPORTS

2.1 INTRODUCTION

2.1.1 The attention of all pilots is drawn to the existence of Paya Lebar Airport close to Singapore Changi Airport. The runway at Singapore Changi Airport is orientated in the same true bearing as the runway at Paya Lebar Airport i.e. 023°/203°. Due to the close proximity of these two runways, pilots are cautioned against mistaking Paya Lebar Airport for the runway of Singapore Changi Airport and thus making an inadvertent visual landing or approach to land at Paya Lebar.

2.1.2 Erroneous approaches or landings usually occurred during the hours of darkness. In almost every instance, the weather prevailing at the time of the incident was generally good or fair.

2.1.3 There is intensive local flying at Paya Lebar and Seletar during the day and night. Thus, the risk of collision is very great if a wrong approach is made to any of the above two airports. Likewise, wrong approaches into Singapore Changi Airport can also be disastrous.

2.2 POINTS TO BEAR IN MIND WHEN APPROACHING SINGAPORE CHANGI AIRPORT OR PAYA LEBAR

2.2.1 The following points are highlighted to serve as a guide to assist pilots in making a correct approach into Singapore Changi Airport or Paya Lebar Airport and should be remembered and followed:

a) The runways at Singapore Changi Airport and Paya Lebar Airport are identically aligned on 02/ 20. Therefore exercise extreme vigilance when leaving NYLON or SAMKO Holding Areas inbound and maintain correct tracks to the respective runways as listed below.

b) Adhere strictly to IFR procedures even in VMC which calls for a procedure turn over NYLON Holding Area or SAMKO Holding Area as prescribed.

c) Make full use of all available navigational and landing aids available and positively identify every aid used.

d) Switch to the correct ILS localizer frequency at Singapore Changi Airport under all conditions.

2.3 AERODROME CHARACTERISTICS OF SINGAPORE CHANGI AND PAYA LEBAR AIRPORTS

2.3.1 Tabulated below are details of aerodrome characteristics of Singapore Changi Airport and Paya Lebar Airport which indicate the similarities and significant differences for ease of identification by pilots operating into these two airports.

Aeronautical Service	PAYA LEBAR Airport	SINGAPORE CHANGI Airport	Significant Remarks and Differences
Magnetic heading of RWY	02/20	02L/20R 02C/20C 02R/20L	Exercise caution due to similar RWY alignment
Approach Lights	RWY 02 Modified Calvert High INTST with centreline and 3 crossbars. High INTST white LGT with brilliancy control and sequenced flashing lights.	RWY 02L Precision APCH LGT CAT II. Extended centreline with red side row barettes, 2 crossbars, 2 APCH beacons and sequenced flashing lights.	
	RWY 20 Modified Calvert High INTST with centreline and 3 crossbars. High INTST white LGT with brilliancy control and sequenced flashing lights.	RWY 20R Precision APCH LGT CAT I. Centreline barettes flashing white, 2 APCH beacons and sequenced flashing lights. (refer to chart AD-2-WSSS-ADC-2)	
ILS	RWY 20 - NIL	RWY 20R IDENT ICH No back beam LLZ 108.9 MHz GP 329.3 MHz	
	RWY 02 - NIL	RWY 02L IDENT ICW No back beam LLZ 110.9 MHz GP 330.8 MHz	
IBN	Flashing R ‘PL’ HN and IMC	Flashing G ‘SS’ HN and IMC	
ABN	NIL	ALTN Flashing W G every 2.3 SEC	

WSSS AD 2.21 NOISE ABATEMENT PROCEDURES

1.1 To alleviate the problem of noise, all aircraft on AWY G579 between SINJON (SJ) and GUMPU shall operate at/above 5,000ft.

1.2 The Standard Instrument Departure routes for aircraft departing on RWY 20R/20C/20L are for the purpose of noise abatement in addition to being used for air traffic control.

1.3 Departures on RWY 20R are restricted between 1600-2200UTC. This restriction is not applicable when RWY 20C/02C and RWY 20L/02R are unavailable because of maintenance works or for other reasons.

1.4 Unless it is necessary for operational or safety reasons, when using engine reverse, arrivals on RWY 02L/20R between 1600-2200UTC may not exceed idle reverse thrust.

WSSS AD 2.22 FLIGHT PROCEDURES

1 LOW VISIBILITY PROCEDURES (LVP) FOR CATEGORY II ILS OPERATIONS

1.1 Introduction

1.1.1 Category II ILS approaches will be made available at Singapore Changi Airport to authorised flights during prolonged periods of low visibility, except during thunderstorms. RVR minima for CAT II ILS operations is limited to 350m due to runway and taxiway light spacing requirements on the airfield.

1.2 Authorisation for Category II ILS Approaches

1.2.1 Operators who wish to conduct Category II ILS operations at Singapore Changi Airport must have obtained operational approval from the relevant State of Operator and be authorised by the Civil Aviation Authority of Singapore.

1.3 Category II ILS Runways

1.3.1 At Singapore Changi Airport, Category II ILS approaches are available only on RWY 02L and RWY 20C, which are also equipped with precision approach Category II lighting system. When required, pilots making Category II ILS approaches to Singapore Changi Airport should refer to the procedures in the Instrument Approach Charts AD-2-WSSS-IAC-1 to AD-2-WSSS-IAC-11 and the Precision Approach Terrain Charts for RWY 02L and RWY 20C at AD-2-WSSS-PATC-1 and AD-2-WSSS-PATC-2 respectively.

1.4 Initiation of Category II ILS Operations

1.4.1 Preparations will be made to implement LVP for Category II ILS operations at Singapore Changi Airport during prolonged period of low visibility, except during thunderstorms, when the RVR drops below 800 metres.

1.4.2 Availability of the Category II ILS approaches will be made known through NOTAM and ATIS broadcasts as well as air traffic control radio communications.

1.4.3 During LVP operations, aircraft will not be cleared for Category II ILS approach if any of the ILS or approach/runway lights fall below Category II requirements. Aircraft will not be cleared for landing if the Touchdown Zone RVR is unserviceable.

1.5 ILS Sensitive Areas

1.5.1 Upon landing, pilots shall report to Changi Tower once the aircraft has cleared the runway and has passed the ILS sensitive areas demarcated by alternate yellow and green lights along the centrelines of Rapid Exit Taxiways and Cross Taxiways.

1.6 Termination of LVP for Category II ILS Operations

1.6.1 LVP for Category II ILS operations will be terminated when RVR has improved above 800 metres. Termination of LVP for Category II ILS operations will be made known through NOTAM and ATIS broadcasts as well as air traffic control radio communications.

1.7 Operations of flights Not Authorised for Category II ILS Operations

1.7.1 During Category II ILS operations, if the RVR is 550 metres or above, flights not authorised for Category II ILS operations may continue to make approaches and land. Airlines planning to operate flights not authorised for Category II ILS operations into Changi shall monitor the METAR to ascertain the RVR values when launching their flights and be prepared to divert if the RVR is below 550 metres.

2 RUNWAY UTILISATION

2.1 Runway-in-use

2.1.1 The runway-in-use (Departure/Arrival) is selected by Aerodrome Control as the optimum for general purposes and to maximise runway utilisation. If the assigned runway is unsuitable for a particular operation, the pilot can obtain permission from ATC to use another runway but should anticipate delay.

2.2 Departures

2.2.1 Pilots should arrange their taxi such that they are ready to depart without delay on reaching the runway holding point. As standard ICAO wake turbulence separation is being applied, pilots are to advise ATC early if more time is needed for the aircraft to be ready for departure. When informed, ATC will be able to make changes in the departure sequence, if necessary, to minimise delays to other succeeding departures.

2.2.2 Pilots should complete cockpit checks prior to line-up for departure and keep any checks on the runway to a minimum.

2.2.3 Conditional line-up clearance may be used by ATC to facilitate an expeditious flow of traffic. On receipt of line-up clearance, pilots should taxi into position promptly without delay. Unless given instructions to line-up and wait, pilots should be ready and prepared to depart without stopping. On receipt of take-off clearance, pilots to commence take-off roll without delay.

2.3 Clearance for Immediate Take-Off

2.3.1 A pilot receiving the ATC instruction 'cleared for immediate take-off' is required to act as follows:

a) if waiting clear of the runway, taxi immediately on to it and begin take-off run immediately without stopping the aircraft;

b) if already lined-up on the runway, take-off without delay;

c) if unable to comply with the instruction, inform ATC immediately.

2.4 Arrivals - Minimum Runway Occupancy Time (ROT)

2.4.1 Arriving aircraft upon landing are reminded that it is imperative to vacate the runway as quickly as practicable to enable ATC to apply minimum spacing on final approach and minimise the occurrence of "go-arounds".

2.4.2 To achieve minimum ROT and reduce missed approaches due to occupied runway, pilots should vacate the runway via the first available exit taxiway corresponding to operational requirements, or as instructed by ATC. If an exit taxiway other than the first available exit taxiway is required, pilots shall advise the Tower Controller on first contact.

2.4.3 To enhance planning, pilots can make reference to the Landing Exit Distance (LED), information below which is measured from threshold to tangent point where the exit taxiway centreline starts to curve away from the runway centreline:

RWY	Exit Taxiway (LED in metres)	Remarks
20R	**W6*(1655)**, **W7*(2123)** and W8(3061)	Note 1: Recommended exit taxiways are bold and underlined. Note 2: * Indicates Rapid Exit Taxiway (RET) and maximum design ground speed for the exit taxiway is 50kts.
20C	**T7*(1924)**,**T8*(2375)**, **D8*(1750)**, **D9*(2225)** and D10*(2700)	
20L	**A7*(1750)**, **A8*(2225)**, and A9*(2700)	
02L	**W5*(1996)**, **W4*(2491)** and W3*(2876)	
02C	**T6*(2040)**, **T5*(2545)**, T4*(3245) **D7*(1900)**, **D6*(2375)** and D5*(2850)	
02R	**A6*(1900)**, **A5*(2375)** and A4*(2850)	

2.4.4 Pilots can expect initial taxi instructions from the Runway Controller before clearing the exit taxiway. Aircraft vacating the runway-in-use should not stop on the exit taxiway until the entire aircraft has passed the runway holding point.

2.4.5 BTN 0830-1030 daily estimated delays of about 15 minutes can be expected for arrivals into Singapore Changi Airport.

2.5 Reduced Runway Separation Minima

2.5.1 Reduced Runway Separation Minima may be applied between a departing aircraft and a succeeding landing aircraft or between two successive landing aircraft on the same runway provided the following conditions exist:

a) During the hours of daylight from 30 minutes after local sunrise to 30 minutes before local sunset;

b) Visibility of at least 5km;

c) Cloud ceiling shall not be lower than 1,000ft;

d) Tailwind component shall not exceed 5 knots;

e) The second aircraft will be able to see the first aircraft clearly and continuously until the first aircraft is clear of the runway;

f) Traffic information shall be provided to the flight crew of the succeeding aircraft concerned;

g) The braking action shall not be adversely affected by runway contaminants such as water;

h) Wake turbulence separation minima shall be applied; and

i) Responsibility for ensuring adequate separation between the two aircraft rests with the pilot of the second aircraft.

2.5.2 When reduced Runway Separation Minima is applied, the successive landing aircraft may be given a clearance to land before the first aircraft has cleared the runway-in-use after landing or crossed the runway end on departure provided there is reasonable assurance that the following separation distances will exist when the landing aircraft crosses the runway threshold:

	Landing following Landing	Landing following Departure
RWY 02L/20R	The preceding aircraft has landed and has passed a point at least 2500m from the threshold of runway (abeam TWY W4 for RWY 02L or TWY V8 for RWY 20R), is in motion and will vacate the runway without backtracking.	The departing aircraft is/will be airborne and has passed a point at least 2500m from the threshold of the runway (abeam TWY W4 for RWY 02L or TWY V8 for RWY 20R).
RWY 02C/20C	The preceding aircraft has landed and has passed a point at least 2500m from the threshold of the runway (abeam TWY T5 for RWY 02C or TWY T8 for RWY 20C), is in motion and will vacate the runway without backtracking.	The departing aircraft is/will be airborne and has passed a point at least 2500m from the threshold of the runway (abeam TWY T5 for RWY 02C or TWY T8 for RWY 20C).
RWY 02R/20L	The preceding aircraft has landed and has passed a point at least 2500m from the threshold of the runway, (abeam TWY A5 for RWY 02R or TWY A8 for RWY 20L) is in motion and will vacate the runway without backtracking.	The departing aircraft is/will be airborne and has passed a point at least 2500m from the threshold of the runway (abeam TWY A5 for RWY 02R or TWY A8 for RWY 20L).

2.6 Phraseology

2.6.1 When issuing a landing clearance following the application of these procedures, ATC will issue the second aircraft with the following instructions:

".... (call sign) .... after the landing / departing .... (Aircraft Type) Runway .....(Designator) cleared to land".

3 AIRPORT COLLABORATIVE DECISION MAKING (A-CDM) MODE OF OPERATIONS

3.1 A-CDM aims to optimise airport operations by having an efficient turnaround process and improving the predictability of operational events. It also helps to improve gate management, flight punctuality, reduce apron taxiway and holding point congestion which is beneficial to all airport partners. A-CDM involves sharing of accurate and timely operational information amongst airport partners through different airport systems and improving work processes by implementing a set of operational procedures.

3.2 The A-CDM procedures apply to all scheduled flights departing Singapore Changi Airport except for VVIP, CASEVAC, SAR and aircraft on special tasks. ATC shall have full discretion in conduct of such operations.

3.3 Definition of commonly used terms in A-CDM

a) Target Off Block Time (TOBT) – The time an aircraft operator (AO) or ground handling agent (GHA) estimates that an aircraft will be ready, all doors closed, boarding bridge removed, pushback vehicle available and ready to start-up / pushback immediately upon receipt of clearance from ATC.
b) Target Start Up Approval Time (TSAT) – The time provided by ATC that an aircraft can expect start-up / push back approval.
c) Calculated Take Off Time (CTOT) – A time calculated as a result of tactical slot allocation, at which a flight is expected to become airborne.

4 A-CDM PRE-DEPARTURE PROCEDURES

4.1 Singapore Changi Airport's A-CDM portal will automatically calculate a system TOBT for each departure flight taking into account the estimated or actual in-block time (EIBT / AIBT), minimum turnaround time (MTT) and scheduled time of departure (STD)

4.2 If the calculated TOBT (EIBT / AIBT + MTT) is earlier than STD, the system will take the STD as TOBT.

4.3 If the calculated TOBT (EIBT / AIBT + MTT) is later than STD, the amount of turnaround delay that system predicts is equal to TOBT – STD.

4.4 AO are required to assess the system generated TOBT at 40 minutes prior to departure and update it if the prediction of departure readiness is different. Thereafter, TOBT needs to be monitored and updated constantly if it is expected to differ by 5 minutes or more until the flight commences pushback. AO can consider delegating the responsibility of TOBT submission to their ground handling agent (GHA) subject to prior internal arrangements between AO and GHA.

4.5 TOBT shall be updated through the following systems:

a) Airport Operations Centre System (AOCS) A-CDM web based portal; or
b) Gate Message Input Display (GMID) at boarding rooms;

4.6 AO/GHA is encouraged to update TOBT through ONLY one of the above systems in order to avoid any chance of a miscommunication.

4.7 TOBT information is available through the following channels:

a) AOCS A-CDM portal;
b) GMID;
c) Aircraft Docking Guidance System (ADGS) at contact stands;
d) Radio communication with GHA or AO.

4.8 The Pre-Departure Sequencer (PDS) will calculate the TSAT automatically by taking into account factors such as TOBT, calculated take-off time (CTOT), variable taxi times (VTT), wake turbulence category, departure separation, etc. A pre-departure sequence is determined from the calculated TSATs, thus the accuracy of TOBT is vital to an optimal TSAT.

4.9 Flights with an invalid or expired TOBT will be instructed by ATC to update TOBT when requesting for clearance. For non-compliant flights, delays can be expected. AO or GHA are strongly encouraged to update TOBT as soon as any expected delay to the aircraft readiness for pushback is made available to avoid unnecessary hold-ups.

4.10 TSAT information is available through the following channels:

a) AOCS A-CDM portal;
b) GMID;
c) ADGS at contact stands;
d) Radio communication with GHA or AO;
e) ATC - Upon issuance of ATC clearance (for flights parked at aircraft stands without ADGS).

5 A-CDM START-UP PROCEDURES

5.1 Pilot shall ensure aircraft is ready for pushback at TOBT.

5.2 Pilot to maintain communication with the AO / GHA as they are responsible for updating the TOBT. Notify the AO / GHA to update the TOBT if it is expected to differ by 5 minutes or more.

5.3 Pilot utilising the DCL service on selected routes shall request for ATC clearance through ‘Request for Departure Clearance Downlink’ (RCD) message no earlier than 20 minutes before TOBT. Refer to WSSS AD 2.22 paragraph 8.4 on the applicable routes for DCL service and procedures.

5.4 Pilot using voice request to contact Ground Movement Planner (Clearance Delivery) and request for ATC clearance within 5 minutes of TOBT using the following phraseology:

– Callsign
– Destination
– Proposed flight level and alternate level, if any
– Parking position

a) Pilot shall only request for ATC clearance provided aircraft is ready to pushback at TOBT.

5.5 Regardless of clearance through voice or datalink, all departing aircraft must report to Clearance Delivery when ready for push within 5 minutes of TOBT.

5.6 ATC will advise the pilot whether the proposed flight level or other alternate flight level is available and an ATC clearance will be issued accordingly. If pre-departure coordination with an adjacent unit or centre is required, the pilot will be instructed to standby.

5.7 ATC will update TSAT changes if any, during issuance of ATC clearances. Note that TSAT displayed on ADGS may not be final and can be revised due to en-route clearance restrictions, ground congestion or flow measures.

5.8 Pilot shall request for pushback from Ground Movement Control within 5 minutes of TSAT after obtaining ATC clearance, or as directed by ATC.

a) ATC may swap pushback sequence based on real-time readiness of aircrafts to maximise apron and runway capacity and reduce the overall delay to traffic as and when required.
b) At the end of pushback, the departing aircraft must be ready to taxi immediately, unless otherwise instructed by ATC.

Note: The first aircraft to taxi may not necessarily be the first aircraft to take-off as distances between aircraft stands and the departure runway vary.

5.9 If a flight is unable to pushback by TSAT + 5 minutes due to the aircraft being unready, ATC clearance and TSAT will be cancelled. Pilot must notify the AO / GHA to update the TOBT for a new TSAT before requesting for a new ATC clearance. This also applies to aircraft returning back to blocks after pushback.

a) ATC will inform the aircraft when a clearance is cancelled using the phraseology; “(Callsign of aircraft) your ATC clearance and TSAT is cancelled (reason). Update TOBT before requesting for new clearance”.
b) Flight may also have its ATC clearance cancelled if it develops a technical problem after pushback and is unable to taxi for prolonged duration.

5.10 Non-compliance of initial TSAT may result in an aircraft losing its existing position in the pre- departure sequence. Delay can be expected as a result of re-sequencing based on new TOBT input.

5.11 If delay in pushback is due to ground traffic movement or ATC clearance restrictions, the ATC clearance and TSAT will remain valid even if it exceeds TSAT + 5 minutes. TOBT need not be updated for such situations.

5.12 In the event that A-CDM mode of operations need to be cancelled due to any reason, the termination will be communicated to relevant parties through email by the airport operator and a NOTAM will be issued by ATC. Pilot shall follow the non-CDM procedures detailed in para 13.

5.13 Quick overview of WSSS start-up for pilots

Definitions of commonly used terms

- **Target Off-Block Time (TOBT)** - The time that an AO or GHA estimates that an aircraft will be ready, all doors closed, boarding bridge removed, pushback vehicle available and ready to start-up / pushback immediately upon receipt of ATC clearance.
- **Target Start-up Approval Time (TSAT)** - The time provided by ATC that an aircraft can expect start-up / pushback approval.

TOBT and TSAT requirements

- Irrespective of the TSAT, the aircraft must be ready for departure at the TOBT +/- 5 minutes as the TSAT may be revised forward at short notice.
- Any time the TOBT or TSAT cannot be met, or an earlier departure is required, the TOBT must be updated expeditiously by the aircraft operator or ground handler.

ATC Clearance

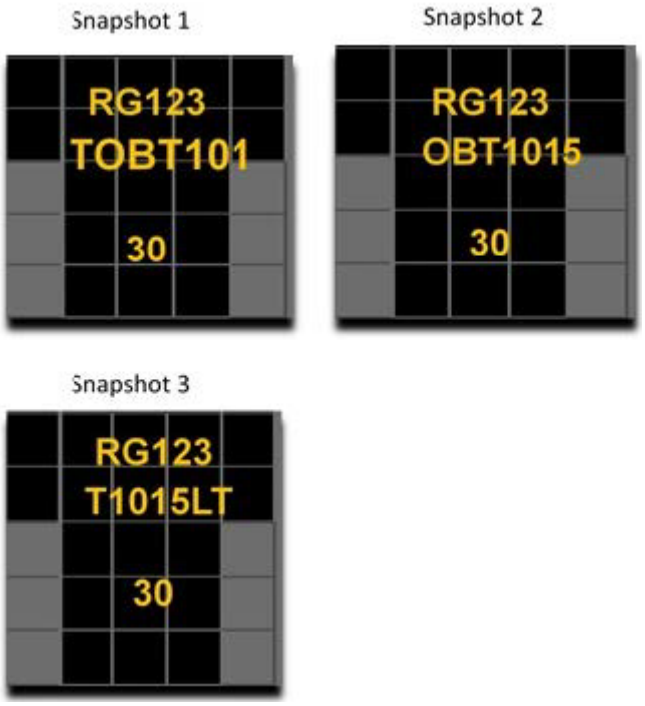
- ATC Clearance on selected ATS routes can be requested via Data Link Departure Clearance (DCL) at TOBT- 20 minutes.
- If DCL is not available, ATC Clearance should be requested via Clearance Delivery at TOBT +/-5 minutes.

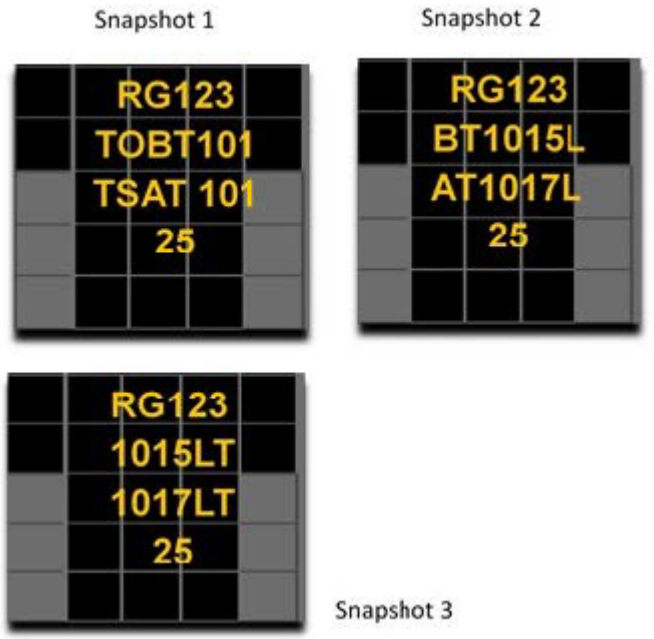
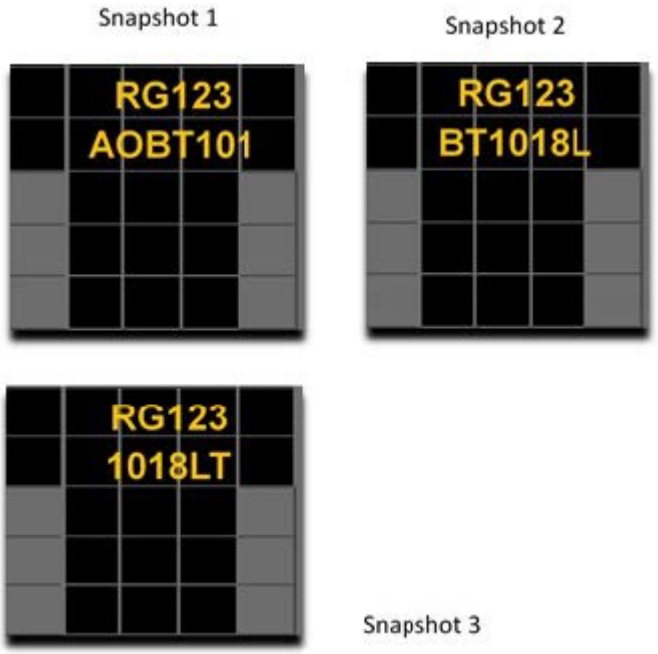
Start-up / Pushback Clearance

- Pilots must be ready for start-up / pushback at TOBT +/- 5 minutes.
- Pilots should request start-up / pushback clearance at TSAT +/- 5 minutes.

6 A-CDM INFORMATION VIA AIRCRAFT DOCKING GUIDANCE SYSTEM (ADGS)

6.1 All contact stands in Singapore Changi Airport will have ADGS. The fundamental operation and usage of ADGS still remain the same for flight crew. Additional information which includes TOBT, TSAT and TOBT count-down timer will be displayed in local times as part of the improvements to support A-CDM operations.

Aircraft Docking Guidance System (ADGS)	
Description	Display on ADGS
Aircraft arrival to stand – No change in existing functionality and display	
40 minutes prior to TOBT – ADGS will display TOBT submitted by AO / GHA and a count down timer (2 digits) to TOBT in minutes – As ADGS can only display up to 7 characters per line, the displayed message will be scrolling. – Timings displayed will be in Local Time (LT) – TOBT timings will change instantly if there is an update done by AO / GHA	

Aircraft Docking Guidance System (ADGS)	
Description	Display on ADGS
25 minutes prior to TOBT – ADGS will display TSAT derived by PDS – As ADGS can only display up to 7 characters per line, the displayed message will be scrolling. – TSAT timings may change as the PDS is continuously optimising push back times based on real time traffic conditions	
Aircraft departure from stand – ADGS will display the actual off-block time (AOBT) – As ADGS can only display up to 7 characters per line, the displayed message will be scrolling. – TOBT, TSAT and TOBT countdown timer will be removed – AOBT display will be removed 3 minutes after AOBT	

7 CONTACT AND INFORMATION

7.1 Please contact the airport operator, Changi Airport Group (CAG), at a-cdm@changiairport.com for application of AOCS A-CDM and GMID account or if you have any queries.

7.2 Aircraft operators may also contact their ground handling agent directly on queries regarding TOBT submission.

8 DEPARTURE CLEARANCE (DCL) VIA DATALINK PROCEDURES

8.1 Aircraft need to be equipped with Aircraft Communications Addressing and Reporting System (ACARS) to support DCL application and be compliant with the European Organisation for Civil Aviation Equipment (EUROCAE) ED-85A (Data Link Application System Document (DLASD) for the DCL datalink service) and ARINC Specification 623-3.

8.2 Singapore application of DCL is in accordance with ED-85A.

8.3 The logon ID of the ground system for the provision of DCL service is WSSS.

8.4 DCL service is only applicable for flights departing from WSSS to the following routes / destinations:

a) Destinations in Peninsular Malaysia via ATS Routes A457 and B466
b) Destinations in Thailand via ATS Routes B466 and B469 / M751
c) Destinations in Indonesia via ATS Route A457, R469 and B470
d) Destinations in Australia and New Zealand via ATS Route B470
e) Flights with allocated Calculated Take-Off Time (CTOT) under Bay of Bengal Cooperative Air Traffic Flow Management (BOBCAT)

8.5 Pilot utilising the DCL service on selected routes shall request for ATC clearance through RCD message no earlier than 20 minutes before TOBT.

a) For flights with allocated CTOT under BOBCAT, to input "CTOT HHMMz'' under the free text field in RCD message.
b) For flights routed via ANITO B470, to input "ANITO FLxxx"(ANITO crossing level) under the free text field in RCD message.
c) Pilot shall contact Clearance Delivery or the next assigned frequency in 'Departure Clearance Uplink' (CLD) message within 5 minutes of TOBT using the following phraseology:
   – <"Callsign"...With P-D-C, fully ready>
   – Provide requested flight level if it differs from PFL filed in flight plan
   – Provide CTOT or ANITO crossing if not previously given in RCD message

8.6 DCL message format does not include the requested cruising level and final cruising level.

a) The planned flight level (PFL) filed in flight plan field 15b will be used as requested level unless otherwise specified by pilot.
b) Final cruising level will be assigned by Singapore ATC after airborne and it is subjected to traffic disposition. No on-ground level negotiations or reservations are allowed.

8.7 DCL service does not provide clearance revision. Any revision to the clearance issued via datalink will be made by ATC through voice communications.

8.8 Clearance request through VHF using the existing voice procedures is still available for applicable flights under the DCL service.

8.9 ATC will reject the DCL request and send a "revert to voice procedures" message to the pilot if one of the following occurs:

a) Flight's routes / destinations not stated in paragraph 8.4
b) RCD message does not comply with ED-85A or have inaccurate flight data,
   e.g. different Callsign / ADES from flight plan
c) Invalid TOBT
d) When required by ATC due to flow restriction

8.10 Upon receipt of any "revert to voice procedures" message, pilot shall cancel any clearance received previously (if any) and follow the existing voice procedures for clearance request, i.e. contact Clearance Delivery within 5 minutes of TOBT.

8.11 Pilot shall monitor the clearance delivery frequency once the DCL process is initiated. In the event of any issues encountered, ATC will revert to voice procedures.

8.12 ATC will revert with CLD message within 5 minutes of receipt of the RCD message. If no CLD message is received, pilot is to call on delivery frequency to verify request.

8.13 Pilot shall respond with 'Departure Clearance Readback Downlink' (CDA) message within 5 minutes of receipt of CLD message. Failure to comply may result in a "revert to voice procedures" message being sent.

Note: The DCL process is only complete and clearance confirmed when CDA message is received and processed successfully. A "CDA received – clearance confirmed" message will be sent to the pilot.

8.14 Aircraft operator / ground handling agent shall continue to update TOBT to reflect any changes in readiness time in accordance to A-CDM startup procedures stated in AIP Singapore section WSSS AD 2.22 paragraph 5.

8.15 ATC will check for TOBT compliance and update pilot of any revisions in departure clearance and flow restrictions before handing the flight over to Ground frequency for start-up and pushback.

8.16 ATC will cancel the clearance issued and send a "revert to voice procedures" message if pilot does not report ready for push within 5 minutes of TSAT.

9 ASSIGNMENT OF FLIGHT LEVELS TO AIRCRAFT DEPARTING FROM SINGAPORE CHANGI AIRPORT

9.1 Assignment of flight levels to departing aircraft is made on a best-planned-best-served basis (with reference to TOBT for ATC clearance request detailed in para 5.4). Aircraft will normally be assigned the level requested unless an alternate level is offered after coordination with the adjacent ATC centres.

9.2 Aircraft departing Singapore requesting FL280, FL300 or FL320 on ATS routes L510, L759, L515/M770, N571, N571/N877, P628 or P574:

a) Aircraft will be assigned No-PDC FL280.
b) Succeeding aircraft on the same ATS route will be assigned No-PDC FL280 with 10-minute longitudinal separation behind provided there is no closing speed with the preceding aircraft.
c) If the succeeding aircraft is faster than the preceding aircraft, additional longitudinal separation as appropriate shall be imposed by ATC.

9.2.1 For aircraft on ATS routes L510, N571, P574 or P628 that are equipped with Automatic Dependent Surveillance – Contract (ADS-C) and Controller-Pilot Data Link Communication (CPDLC):

a) Succeeding aircraft on the same ATS route will be assigned No-PDC FL280 with 7-minute longitudinal separation behind and provided there is no closing speed with the preceding aircraft.
b) If the succeeding aircraft is faster than the preceding aircraft, additional longitudinal separation as appropriate shall be imposed by ATC.

10 DELAY IN PUSHBACK AND/OR TAXIING DUE TO OTHER AIRCRAFT

10.1 Delays may be expected for the second aircraft to pushback and to taxi when two or more aircraft are parked either adjacent to one another or close together. However, it will retain its ATC clearance even if the 5 minutes grace period allowed for under para 5.9 is exceeded.

Note: The TSAT may not be able to predict delays arising from apron congestion as traffic movement on ground is dynamic and situations may change on a real time basis depending on aircraft readiness. ATC will facilitate pushback as soon as possible when traffic permits.

11 DELAY IN TAKE-OFF DUE TO RESTRICTIONS IN THE ATC CLEARANCE

11.1 The ATC clearance may require an aircraft to arrive at a reporting point at a specified time and level or to depart a number of minutes behind a preceding traffic to establish the appropriate longitudinal separation. Such delay will not deprive a departing aircraft of its ATC clearance even though the 5 minutes grace period allowed for under para 5.9 is exceeded.

12 DELAY DUE TO OVERFLIGHTS

12.1 Overflights are flights that traverse Singapore FIR and/or airspace within the Jakarta FIR where ATS is provided by Singapore (see ENR 2.1) without landing at Singapore Changi Airport. Depending on the positions of overflights, a departing aircraft requesting the same flight level may have to accept an alternate flight level or delay its departure in order to establish the prescribed separation.

13 NON-CDM MODE OF OPERATIONS

13.1 The non-CDM procedures is applicable for non-scheduled flights departing Changi Airport or when TOBT and TSAT references used in A-CDM mode of operations become unavailable due to system issues or maintenance.

13.2 If TOBT cannot be submitted or it is unavailable through different channels stated in para 4.5,

a) Pilots shall notify ATC when the aircraft is ready to pushback within 5 minutes.
b) ATC will advise the pilot whether the proposed flight level or other alternate flight level is available and an ATC clearance will be issued accordingly. If pre-departure coordination with an adjacent unit or centre is required, the pilot will be instructed to standby.
c) Once flight level is accepted by the pilot and an ATC clearance issued, the aircraft must be pushed back within 5 minutes from the time the ATC clearance is accepted unless other ATC restrictions are imposed. The ATC clearance will be cancelled on expiry of the 5 minutes grace period. This also applies to situations when aircraft return to blocks after pushback or develop technical issues and is unable to continue taxi.
d) Pilots who are ready to depart following the cancellation of an ATC clearance will adopt the procedures as if it is the first time they are ready to depart.

13.3 If TSAT is unavailable through different means stated in para 4.10,

a) AO and GHA shall continue to submit TOBT and pilots shall request for ATC clearance 5 minutes within TOBT stated in para 5.4
b) ATC will revert to the gate hold procedures stated in para 14 and issue estimated pushback times accordingly.

14 GATE HOLD PROCEDURES FOR DEPARTING AIRCRAFT (DURING NON-CDM MODE OF OPERATIONS)

14.1 Whenever there are about five to seven departing aircraft at the runway holding point, subsequent pushback of departures will be regulated such that the Ground Movement Planner (GMP) on VHF frequency 121.65MHz will start to issue pilots with Expected Pushback Time (EPT) as TSAT used in A-CDM operations is not available. The determination of EPT will take into account an aircraft's parking stand as well as taxi time to the runway-in-use holding point.

14.2 When an EPT is issued, pilots will be instructed to either remain on GMP frequency or to monitor Singapore Ground Control (frequencies 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz or 125.65MHz). It should be noted that when instructed to monitor the Singapore Ground frequencies, pilots shall not establish contact with the Singapore Ground Control, rather, pilots shall maintain listening watch on the assigned Singapore Ground Control frequency and wait for pushback instruction. This is to prevent unnecessary frequency congestion.

14.3 A flight issued with an EPT but chooses to commence pushback before the assigned time will be allowed to do so subject to traffic. However, the flight should not expect an earlier departure time as the planned pre-departure sequence will be maintained.

14.4 In a situation when a departing aircraft is occupying a gate that has been assigned to an arriving aircraft, the departing aircraft will be instructed by GMP to contact Singapore Ground Movement Control for pushback for the purpose of better gate utilisation.

14.5 To maximise runway utilisation, departure sequence will be planned on the basis of increasing runway throughput so as to enhance overall efficiency.

15 GROUND MOVEMENT PLANNER ON VHF 121.65MHz

15.1 The frequency shall be used for aircraft pre-flight checks and ATC clearances. Pilot-in-command to make his initial call from the parked position on this frequency.

16 GROUND MOVEMENT CONTROL ON VHF 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz, 125.65MHz AND 127.275MHz

16.1 This frequency shall be used for aircraft start-up/push-back clearance.

16.2 Unless otherwise instructed by ATC, the pilot-in-command shall prior to starting engines listen out on the Ground Movement Control frequency on 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz or 125.65MHz.

16.3 The pilot-in-command shall:

a) Request and obtain taxi instructions prior to taxiing;

Note: ATC clearance, including the assigned SSR code will normally be issued prior to push back. Pilot shall squawk the SSR code immediately when airborne.

b) Change from Ground Movement Control frequency to the Runway Control frequency when instructed (118.6MHz, 118.25MHz or 131.4MHz). It should be noted that when instructed to monitor Singapore Tower frequencies, pilots shall not establish contact with Singapore Tower; rather, pilots shall maintain a listening watch on the assigned Singapore Tower frequency and wait for instruction. This is to prevent unnecessary frequency congestion.

16.4 Departing aircraft will be instructed when to change from 118.6MHz, 118.25MHz or 131.4MHz to Singapore Departure frequency 120.3MHz.

16.5 In the case of the aircraft having landed, the pilot-in-command shall change from 118.6MHz, 118.25MHz or 131.4MHz to 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz, 125.65MHz or 127.275MHz immediately upon instructed by ATC after clearing the runway. He shall maintain watch on 121.725MHz, 121.85MHz, 122.55MHz, 124.3MHz, 125.65MHz or 127.275MHz for taxiing and parking instructions until he arrives at his aircraft stand.

17 TAXIING

17.1 Taxi clearance given by Singapore Ground Movement Control will relate to movement on the manoeuvring area, but excluding the marshalling area.

17.2 Aircraft taxiing on the manoeuvring area will be regulated by ATC to avoid or reduce possible conflict and will be provided with traffic information and alerting service. ATC shall apply taxiing clearance limits whenever necessary.

17.3 The taxiway routes to be used by aircraft after landing or when taxiing for departure will be specified by ATC. The issuance by ATC of a taxi route to an aircraft does not relieve the pilot-in-command of the responsibility to maintain separation with other aircraft on the manoeuvring area or to comply with ATC directions intended to regulate aircraft on the manoeuvring area. **Pilots are also advised of the possibility of misjudging the clearance between the aircraft wing tips and other obstacles, especially in areas of hot-spots or during low-light / poor visibility conditions.**

17.4 Pilots are reminded to always use minimum power when starting engines, when manoeuvring within the apron area or when manoeuvring from apron taxiways to other parts of the aerodrome. It is especially critical when commencing to taxi that break-away thrusts are kept to an absolute minimum and then be reduced to idle thrusts as soon as possible.

17.5 TWY K (north of RWY 02C/20C) and TWY L (south of RWY 02C/20C) are End-Around Taxiways to facilitate aircraft movement between the east and west of RWY 02C/20C. Aircraft taxiing on these taxiways will be regulated by ATC to avoid conflict with aircraft operating on RWY 02C/20C.

18 TAKE-OFF AND LANDING

18.1 Departing aircraft will normally be directed by ATC to use the full length of the runway for take-off. On obtaining an ATC clearance the aircraft shall enter the runway via designated taxiways:

RWY 02R – TWY A10, A11 or A12

RWY 02C - TWY T12, T13, D13, D14

RWY 02L - TWY W8, W9 or W10

RWY 20L – TWY A1, A2 or A3

RWY 20C - TWY T1, T2, D1, D2

RWY 20R - TWY W1, W2

18.2 The pilot-in-command shall not take-off or land without a clearance from Aerodrome Control.

18.3 The pilot-in-command shall not run-up on the runway in use unless authorised by Aerodrome Control. Engine run-ups in the holding pan or taxiway holding point clear of the runway in use may be carried out subject to approval by Aerodrome Control.

18.4 After landing, the pilot-in-command shall vacate the runway by the shortest suitable route and to contact Singapore Ground Movement Control who will issue specific taxi route instructions to its assigned aircraft stand.

18.5 Aircraft with radio communication failure shall vacate the runway and stop on the taxiway and watch for light signals from Aerodrome Control.

19 STANDARD INSTRUMENT DEPARTURE (SID) AND STANDARD INSTRUMENT ARRIVAL (STAR)

19.1 INTRODUCTION

19.1.1 The SIDs and STARs for Singapore Changi Airport require aircraft to be GNSS-equipped and approved with navigation systems that meet the ICAO RNAV-1 navigation specification in accordance to the ICAO Performance Based Navigation Manual (Doc 9613).

19.1.2 To avoid proliferation of SIDs and STARs, the basic RNAV SIDs and STARs follow similar tracks as the RNAV-1 (GNSS) SIDs and STARs using the same set of SIDs and STARs identification.

19.1.3 Operators / pilots who are not approved to operate on the RNAV-1 (GNSS) SIDs and STARs shall notify ATC and operate on the alternate basic RNAV SIDs and STARs or expect radar vectors from ATC.

19.2 ARRIVALS

19.2.1 Arriving aircraft from the various ATS routes shall plan for the respective RNAV-1 STARs with the associated flight planning requirement as shown below:

ATS Route	RNAV-1 STAR	Remarks and Flight Planning Requirement
A464 (southbound to Singapore)	TEBUN	Arrivals into Changi to flight plan via A464 - ARAMA – TEBUN. After TEBUN, to join the TEBUN STAR. When traffic permits and WSSS Runway 20 is in use, ATC will offer LELIB STAR.
A576 (southbound to Singapore)	Not applicable	Southbound flight landing at WSSS are not permitted to flight plan via A576.
G579	REPOV	NIL
G580	KARTO	NIL
L504 / T22	UGEBO	Arrivals into Changi on L504 to flight plan via OBDOS – T22 – UGEBO. After UGEBO, to join the UGEBO STAR.
L642[1]	ELALO	ESPOB Q801 Q802 ELALO / ESPOB DCT ELALO
L762	ASUNA	NIL
M635 / T23	UGEBO	Arrivals into Changi on M635 to flight plan via SURGA – T23 – UGEBO. After UGEBO, to join the UGEBO STAR.
M646	KARTO	NIL
Y514	Not applicable	Y514 NUFFA PIBAP PASPU. After PASPU, expect radar vectors.
M753	ELALO	IPRIX Q802 ELALO
M767	KARTO	NIL
M774 / T22		Arrivals into Changi on M774 to flight plan via OBDOS – T22 – UGEBO. After UGEBO, to join the UGEBO STAR.
M904	ELALO	UPRON Q803 ELALO

ATS Route	RNAV-1 STAR	Remarks and Flight Planning Requirement
N891	ELALO	N891 ENREP DCT ELALO
N892[1]	MABAL	MELAS DCT MABAL
R469	ASUNA	NIL
Note: The LEBAR STAR serves as a transition option to the STARs listed above. This is to facilitate arrivals joining downwind to the west of Singapore Changi Airport. ATC may clear arrivals to join the LEBAR STAR when air traffic permits. [1]Refer to ENR 1.3 and ENR 3.2 for Direct Routing Operations (DRO) flight planning procedures.		

19.2.2 All RNAV-1 (GNSS) STARs terminate at the initial approach fix (IAF). Arrivals can expect radar vectors for approach to the respective runways.

19.3 DEPARTURES

19.3.1 All departing aircraft will be cleared on the appropriate RNAV-1 (GNSS) SIDs or radar departure to join the planned ATS route and shall climb initially to 3,000ft.

19.3.2 RNAV-1 (GNSS) SIDs will be assigned to departures from Singapore Changi Airport that flight plan on the following ATS routes:

ATS Route	RNAV-1 SID	Remarks and Flight Planning Requirements
A457	MASBO	NIL
B470	ANITO	NIL
G580 / M646	TOMAN	NIL
L625 / N884	TOMAN	NIL
L762	MIBEL	NIL
M751	MERSING	NIL
M753	MERSING	VMR L642 EGOLO DCT IPRIX[2] Expect radar vectors or further ATC clearance on approaching VMR.
M771	MERSING	VMR DOLOX M771 Expect radar vectors or further ATC clearance on approaching VMR.
N884	Not applicable	Not available for flight planning between VMR and LUSMO. Flight plan via TOMAN L625 LUSMO N884.
N891	MERSING	VMR ENREP N891 Expect radar vectors or further ATC clearance on approaching VMR.
R469	TAROS	NIL
T21 / L504	DODSO	Departures joining ATS route L504 to flight plan via DODSO T21 OBDOS.
T21 / M774	DODSO	Departures joining ATS route M774 to flight plan via DODSO T21 OBDOS.
T24 / M635	IDBUD	Departures joining ATS route M635 to flight plan via IDBUD T24 SURGA M635.
W26	KIRDA	NIL
Y513	AROSO	Flight planning permitted for flights departing from or overflying Singapore to destinations north of Kuala Lumpur and Subang Airports. For flights operating at FL220 and below, to flight plan on A457.
[2]Refer to ENR 1.3 and ENR 3.2 for Direct Routing Operations (DRO) flight planning procedures.		

19.4 VERTICAL AND SPEED RESTRICTIONS

19.4.1 Pilots shall comply with an ATC assigned level. Pilots shall also adhere to the vertical and speed restrictions depicted on the SIDs and STARs. ATC clearance will take precedence when the ATC clearance does not allow the pilots to adhere to the vertical and speed restrictions depicted on the SIDs and STARs.

19.5 OPERATORS' PROCEDURES

19.5.1 The operator shall ensure that in-flight procedures, crew manuals and training programmes are established in accordance with RNAV-1 (GNSS) navigation requirements.

19.5.2 Pilots shall inform ATC when on-board equipment does not meet the RNAV-1 (GNSS) navigation requirements. Pilots can then expect radar vector from ATC.

20 COORDINATES OF SID/STAR WAYPOINTS (WGS84 DATUM)

Name	Coordinates	Radius/Distance from VTK	Radius/Distance from SJ
ABVIP	01 00 08 N 103 50 32 E	VTK R-203.5 / D27.0	SJ R-183.5 / D13.2
ADPON	01 01 08 N 103 58 08 E	VTK R-163.1 / D13.4	SJ R-95.3 / D14.1
AGROT	01 01 08 N 103 58 08 E	VTK R-187.7 / D24	SJ R-150.8 / D14.0
AGVAR	01 47 19 N 103 41 45 E	VTK R-318.8 / D29.8	SJ R-344.3 / D35.3
AKMET	01 53 55 N 103 43 39 E	VTK R-328.6 / D34.0	SJ R-349.3 / D41.3
AKOMA	01 45 22 N 103 54 43 E	VTK R-342.0 / D21.4	SJ R-6.2 / D32.0
ALFA	01 30 33 N 103 49 42 E	VTK R-295.7 / D12.9	SJ R-354.8 / D17.2
ANITO	00 17 00 S 104 52 00 E	VTK R-153.4 / D113.4	SJ R-146.0 / D108.6
ARAMA	01 36 54 N 103 07 12 E	VTK R-282.4 / D55.5	SJ R-298.0 / D50.0
AROSO	02 08 46 N 103 24 21 E	VTK R-319.9 / D57.4	SJ R-334.0/ D61.7
ASITI	00 49 06 N 103 50 42 E	VTK R-196.6 / D37.2	SJ R-181.3 / D24.1
ASOMI	01 01 42 N 104 02 07 E	VTK R-178.1 / D23.1	SJ R-136.9 / D15.9
ASUNA	00 59 48 N 103 09 54 E	VTK R-244.1 / D57.3	SJ R-252.0 / D43.6
ATLEX	01 03 02 N 103 33 31 E	VTK R-232 / D-35.4	SJ R-240 / D20.5
ATRUM	01 32 56 N 104 00 57 E	VTK R-357.3 / D8.0	SJ R-26.1 / D21.8
BETBA	01 33 02 N 103 53 31 E	VTK R-316.1/ D11.3	SJ R-6.3 / D19.8
BIDUS	01 35 54 N 103 57 55 E	VTK R-326.0 / D13.2	SJ R-6.9 / D22.6
BIPOP	01 31 22 N 104 10 18 E	VTK R-54.5 / D11.0	SJ R-46.8 / D26.2
BISOV	00 42 29 N 102 52 14 E	VTK R-238.6 / D81.1	SJ R-242.6 / D66.6
BITAM	01 08 13 N 104 07 57 E	VTK R-158.3 / D17.9	SJ R-107 / D17.5
BOBAG	01 02 30 N 103 29 54 E	VTK R-234.7 / D38.6	SJ R-243.2 / D24
BOKIP	01 04 21 N 103 43 53 E	VTK R-220.5 / D27.0	SJ R-219.5 / D11.6
DODSO	01 22 25 N 106 14 02 E	VTK R-91 / D154.3	SJ R-86.4 / D143.3
DOVAN	01 19 38 N 104 12 49 E	VTK R-114.6 / D12.7	SJ R-73.9 / D22.5
DUBOT	01 08 46 N 104 01 03 E	VTK R-181 / D16.1	SJ R-115 / D10.8
DUMUP	00 54 30 N 103 55 16 E	VTK R-191.4 / D30.9	SJ R-167.9 / D19.2
ELALO	04 12 40 N 104 33 29 E	VTK R-10.6 / D169.9	SJ R-13.4 / D183.3
EMRIX	01 26 06 N 104 10 40 E	VTK R-83.0 / D9.4	SJ R-57.0 / D23.2
ERVIV	01 04 45 N 104 10 13 E	VTK R-156.1 / D22	SJ R-114.3 / D20.8
GIXEM	00 49 20 N 104 25 39 E	VTK R-145.5 / D43	SJ R-124.8 / D41.9
GOTGA	01 20 13 N 104 42 00 E	VTK R-96.6 / D41	SJ R-82.3 / D51.3
GUMPU	01 30 00 N 103 42 43 E	VTK R-285.1 / D19.3	SJ R-332.6 / D18.6
GUNUD	01 10 42 N 105 06 18 E	VTK R-102.3 / D66.6	SJ R-92 / D75.2
GURES	00 28 14 N 104 38 35 E	VTK R-146.4 / D67.5	SJ R-133.3 / D65.2
HOSBA	01 19 48 N 104 24 17 E	VTK R-102.5 / D23.6	SJ R-79 / D33.7
IBASU	00 57 51 N 103 34 10 E	VTK R-225.3 / D38.3	SJ R-228 / D23.1
IBIVA	01 13 51 N 103 56 37 E	VTK R-203.1/ D12.0	SJ R-84.3 / D5.3
IBIXU	01 16 21 N 103 57 40 E	VTK R-203.2 / D9.3	SJ R-64.4 / D7.0
IDBUD	00 14 54 N 105 01 39 E	VTK R-139.1 / D92.2	SJ R-129.5 / D91.4
IDKIV	00 56 52 N 104 13 33 E	VTK R-156.3 / D30.5	SJ R-126.3 / D27.7
IGNON	01 08 47 N 104 12 57 E	VTK R-144.1 / D19.8	SJ R-101.8 / D22.2
IGOSI	00 56 45 N 104 06 44 E	VTK R-169.1 / D28.6	SJ R-136.8 / D22.7
IKIRO	00 08 49 N 104 44 20 E	VTK R-150.4 / D87.1	SJ R-140.4 / D83.4
ISGIL	00 42 46 N 103 12 57 E	VTK R-229.1 / D64.1	SJ R-231.6 / D49
ISNOM	01 06 29 N 103 58 26 E	VTK R-189 / D18.6	SJ R-133.6 / D9.9

Name	Coordinates	Radius/Distance from VTK	Radius/Distance from SJ
KANLA	03 45 56 N 104 36 06 E	VTK R-13.8 / D144.5	SJ R-16.5 / D158.3
KARTO	01 11 24 N 105 33 43 E	VTK R-98.3 / D93.5	SJ R-91.1 / D102.6
KEXAS	01 10 19 N 104 48 18 E	VTK R-107.2 / D49.2	SJ R-93.0 / D57.2
KILOT	03 02 17 N 104 40 23 E	VTK R-22.0 / D104.5	SJ R-24.4 / D119.0
KIRDA	00 00 09 N 104 59 34 E	VTK R-145.4 / D102.7	SJ R-136.8 / D100.1
LAVAX	01 09 50 N 104 27 14 E	VTK R-120.1 / D30.0	SJ R-95.5 / D36.2
LEDOX	01 16 42 N 103 56 51 E	VTK R-208.6 / D9.4	SJ R-58.5 / D6.5
LELIB	01 27 29 N 103 24 50 E	VTK R-274.0 / D36.6	SJ R-298.0 / D30.0
LETGO	01 14 11 N 103 55 48 E	VTK R-207.3 / D12.1	SJ R-79.1 / D4.6
MABAL	03 28 26 N 105 12 36 E	VTK R-30.1 / D142.1	SJ R-31.2 / D157.2
MASBO	02 02 48 N 102 52 51 E	VTK R-299.0 / D78.3	SJ R-310.2 / D76.6
MIBEL	01 23 51 N 102 08 16 E	VTK R-269.5 / D113.2	SJ R-275.8 / D103.7
MOLVO	01 29 55 N 104 02 27 E	VTK R-12.8 / D5.1	SJ R-34.2 / D20
MOXIB	01 29 33 N 104 03 15 E	VTK R-22.7 / D5	SJ R-36.7 / D20.1
MUMDU	01 05 21 N 104 27 14 E	VTK R-126.9 / D32.4	SJ R-102.5 / D36.9
NYLON	01 36 57 N 104 06 24 E	VTK R-23 / D13	SJ R-32.9 / D30.0
PALGA	01 10 59 N 103 47 59 E	VTK R-223.8 / D19.3	SJ R-235.1 / D4.1
PAMSI	01 04 59 N 103 48 45 E	VTK R-212.3 / D23.6	SJ R-197.2 / D8.7
PASPU	01 59 15 N 104 06 18 E	VTK R-8.3 / D34.5	SJ R-18.3 / D48.1
PIBAP	02 30 23 N 104 06 18 E	VTK R-4.4 / D65.3	SJ R-11.1 / D78.1
POSUB	01 27 25 N 104 07 48 E	VTK R-69.0 / D6.9	SJ R-49.8 / D21.7
POVEB	01 13 44 N 104 01 30 E	VTK R-179.2 / D11.1	SJ R-87.9 / D10.3
PU	01 25 24 N 103 56 00 E	VTK R-275.2 / D5.4	SJ R-21.1 / D13.0
REMES	00 43 42 N 103 57 35 E	VTK R-185.2 / D41.2	SJ R-167.9 / D30.2
REPOV	00 16 23 N 104 03 00 E	VTK R-178.6 / D68.2	SJ R-168.3 / D57.9
RWY 02R DER	01 21 22 N 104 00 51 E	VTK R-187.8 / D3.6	SJ R-50.3 / D12.5
RWY 02C DER	01 21 45 N 103 59 57 E	VTK R-203.3 / D3.4	SJ R-45.8 / D12.1
RWY 02L DER	01 23 05 N 103 59 33 E	VTK R-224.1 / D2.5	SJ R-40.6 / D12.8
RWY 20C DER	01 19 42 N 103 59 05 E	VTK R-203 / D5.7	SJ R-50.8 / D10.1
RWY 20R DER	01 20 47 N 103 58 35 E	VTK R-213.7 / D4.9	SJ R-44.8 / D10.4
RWY 20L DER	01 19 19 N 103 59 59 E	VTK R-193.7 / D5.7	SJ R-55.8 / D10.6
SABKA	01 50 51 N 103 17 13 E	VTK R-300.4/ D51.2	SJ R-317.7 / D50.7
SALRU	01 17 01 N 104 08 02 E	VTK R-139.5 / D10.3	SJ R-77.8 / D17.2
SAMKO	01 05 30 N 103 52 55 E	VTK R-203.5 / D21.1	SJ R-168 / D8
SANAT	01 07 49 N 103 59 30 E	VTK R-186.1 / D17.1	SJ R-123.7 / D9.9
SEBVO	01 12 59 N 104 40 28 E	VTK R-109.5 / D35.6	SJ R-90.5 / D43.6
SJ (SINJON)	01 13 21 N 103 51 15 E	-	-
SURGA	00 36 57 S 106 31 19 E	VTK R-129.1 / D193.3	SJ R-124.6 / D194.3
TAROS	00 42 00 N 102 16 12 E	VTK R-247.9 / D139.4	SJ R-251.9 / D100.2
TEBUN	01 14 55 N 103 15 57 E	VTK R-257.7 / D46.5	SJ R-272.5 / D35.4
TOMAN	01 21 47 N 105 47 17 E	VTK R-91.7 / D106.2	SJ R-85.9 / D116.5
UGEBO	00 38 13 N 105 24 32 E	VTK R-119.1 / D95.4	SJR-110.5 / D99.8
UKIBO	01 17 58 N 103 59 24 E	VTK R-195.7 / D7.2	SJ R-60.6 / D9.4
UPTEL	00 59 25 N 104 07 30 E	VTK R-166.3 / D26.1	SJ R-130.5 / D21.4
VAMPO	00 58 33 N 103 25 25 E	VTK R-233.9 / D44.5	SJ R-240.4 / D29.8
VANBU	01 06 43 N 104 27 40 E	VTK R-124.5 / D32	SJ R-100.3 / D37.1

Name	Coordinates	Radius/Distance from VTK	Radius/Distance from SJ
VASTI	00 43 20 N 104 34 06 E	VTK R-141.6 / D52.8	SJ R-124.8 / D52.3
VEBMA	01 20 30 N 104 53 32 E	VTK R-94.8 / D52.5	SJ R-83.5 / D57.8
VEXEL	00 59 04 N 103 42 54 E	VTK R-215.7 / D31.7	SJ R-210.5 / D16.5
VIBOG	00 43 10 N 103 43 02 E	VTK R-203.8 / D45.4	SJ R-195.3 / D31.2
VIGUD	01 13 28 N 103 57 30 E	VTK R-198.6 / D69.7	SJ R-89 / D6.2
VIMAL	01 09 42 N 104 23 53 E	VTK R-123.8 / D27.2	SJ R-96.4 / D22.9
VIRET	00 39 40 N 104 35 11 E	VTK R-143 / D56.4	SJ R-127.3 / D55.3
VMR	02 23 18 N 103 52 18 E	VTK R-351.2 / D58.8	SJ R-0.9 / D69.6
VOVOS	01 11 23 N 103 26 51 E	VTK R-248.7 / D37.1	SJ R-265.4 / D24.5
VTK (TEKONG)	01 24 55 N 104 01 20 E	-	-

21 SID / STAR PHRASEOLOGIES

21.1 SID / STAR phraseologies allow ATC and pilot to communicate and understand detailed clearance information that would otherwise require long and potentially complex transmissions. To eliminate safety risk due to a mismatch between ATC and pilot expectations when SID / STAR phraseologies are used, and what certain terms may mean, ICAO has published Amendment 7-A to Doc 4444, PANS- ATM to harmonise the core phraseologies that positively reinforce the lateral, vertical and speed requirements embedded in a SID or STAR that will continue to apply, unless explicitly cancelled or amended by the controller.

21.2 The core phraseologies are:

i. CLIMB VIA SID TO (level)
ii. DESCEND VIA STAR TO (level)

21.3 These require the aircraft to:

i. Climb / descend to the cleared level in accordance with published level restrictions;
ii. Follow the lateral profile of the procedure; and
iii. Comply with published speed restrictions or ATC-issued speed control instructions as applicable.

21.4 Phraseologies for removal of speed or level restrictions are:

i. CLIMB VIA SID TO (level), CANCEL SPEED RESTRICTION(S)
ii. DESCEND VIA STAR TO (level), CANCEL LEVEL RESTRICTION(S) AT (point(s))

21.5 These phraseologies mean that:

i. The lateral profile of the procedure continue to apply and
ii. Speed or level restrictions which have not been referred to will continue to apply.

21.6 Phraseologies for variations to the lateral profile of the SID / STAR are:

i. PROCEED DIRECT (waypoint), or
ii. VECTORING

21.7 These phraseologies mean that speed and level restrictions associated with the bypassed waypoints are cancelled.

21.8 Phraseology to clear aircraft to return to SID / STAR is: REJOIN SID / STAR

21.9 This phraseology means that speed and level restrictions associated with the waypoint where the rejoin occurs, as well as those associated with all subsequent waypoints must be complied with.

21.10 The term ‘VIA’ will no longer be used when issuing lateral routing clearances.

22 LIGHT AIRCRAFT OPERATIONS

22.1 Light aircraft operations into and out of Singapore Changi Airport may be approved subject to the following conditions:

a) Prior permission has been granted;
b) Aircraft is suitably equipped;
c) Pilot is appropriately rated;
d) Subject to ATC.

22.2 Flight notification shall be given by filing a flight plan.

22.3 All such operations will be regulated in accordance with IFR procedures.

23 CHANGI FLOW MANAGEMENT PROCEDURES

23.1 INTRODUCTION

23.1.1 The objectives of the procedures are to improve the efficiency of Singapore's air traffic service by minimising radar vectoring as well as improving airspace capacity.

23.1.2 The procedures require the holding of Changi arrivals over established holding areas.

23.2 ENTRY AND EXIT GATES

23.2.1 'Entry gates' and 'Exit gates' are established to ensure segregation between arriving and departing aircraft operating at Singapore Changi Airport. These gates (waypoints) are incorporated in the RNAV SIDs/STARs which have been implemented to support the flow management procedures. The 'entry' and 'exit' gates are shown below:

Entry Gate	Coordinates
KEXAS	01 10 19 N 104 48 18 E
PASPU	01 59 15 N 104 06 18 E
REMES	00 43 42 N 103 57 35 E
VAMPO	00 58 33 N 103 25 25 E

23.3 ARRIVING AIRCRAFT TO SINGAPORE CHANGI AIRPORT

23.3.1 STANDARD INSTRUMENT ARRIVAL (STAR)
IFR flight should expect a Standard Instrument Arrival (STAR).

23.3.2 ENTRY GATE TIME
To regulate the flow of traffic into the Approach airspace, ATC will issue, when necessary, a time restriction at an entry gate associated with the inbound route of the flight into Singapore Changi Airport.

23.3.3 DESCENT PROFILE
Pilots shall plan their descent profile in accordance with the published STAR procedures.

23.3.4 SPEED CONTROL
Speed control restrictions are incorporated into the STARs to enhance predictability and planning of air traffic in the Approach airspace. Pilots shall adhere to the speed control restrictions published in the STAR procedures unless otherwise advised. ATC may issue further speed adjustment during the different phases of the flight if traffic situation warrants.

23.4 APPROACH AIRSPACE HOLDING PROCEDURES

23.4.1 ENTRY PROCEDURE
The entry into the holding patterns shall be in accordance with the three-sector entry procedure as prescribed in ICAO Doc 8168 - OPS/611 Edition 1993.

23.4.2 RATE OF TURN
All turns are to be made at a bank angle of 25° or at a rate of 3° per second, whichever requires the lesser bank.

23.4.3 DESCENT PROCEDURE
When instructed to join a holding pattern, pilots shall reach their assigned altitudes prior to arriving at the holding point. This will allow appropriate traffic sequencing and the reduction of step-descents in the holding pattern.

23.4.4 DETAILS OF APPROACH AIRSPACE HOLDING AREAS

Holding Fix / ID / Co-ordinates	Inbound Track °M	Direction of Turn	MAX HLDG Speed (IAS)	Time (MIN)	MNM-MAX HLDG Level	Controlling Unit and Frequency
1	2	3	4	5	6	7
NYLON 013657N 1040624E	203°	Left	220 knots	1	FL140 3,000ft	Singapore Approach 124.05MHz (PRI) 132.15MHz (SRY)
KEXAS 011019N 1044818E	268°	Left	220 knots	1	FL160 11,000ft	Singapore Approach 124.05MHz (PRI) 132.15MHz (SRY)

Holding Fix / ID / Co-ordinates	Inbound Track °M	Direction of Turn	MAX HLDG Speed (IAS)	Time (MIN)	MNM-MAX HLDG Level	Controlling Unit and Frequency
REMES 004342N 1035735E	348°	Left	220 knots	1	FL140 6,000ft	Singapore Approach 124.6MHz (PRI) 132.15MHz (SRY)
BOBAG 010230N 1032954E	082°	Right	220 knots	1	FL140 6,000ft	Singapore Approach 124.6MHz (PRI) 132.15MHz (SRY)
VAMPO 005833N 1032525E	149°	Right	220 knots	1	FL180 6,000ft	Singapore Approach 124.6MHz (PRI) 132.15MHz (SRY)

23.4.5 ALTERNATE HOLDING AREAS
In the event of inclement weather or capacity constraints rendering a specific holding area unusable, arrivals may be cleared to an alternate holding area for re-sequencing. To ensure smooth transition to alternate holding area, all arrivals bound for Singapore Changi Airport shall have their FMS programmed with all the four promulgated holding areas (paragraph 23.4.4).

23.5 EXPECTED TIME TO LEAVE HOLDING AREA

23.5.1 If arrival delay is processed by means of holding, pilots will be informed of the expected time to leave the respective holding area.

23.5.2 The expected time to leave is issued to serve as an early notification of the probable holding duration as well as for unforeseen circumstance such as radio failure (see ENR 1.6). Subsequently, a specified time to leave the holding area will be issued to pilots to resume the flight according to the assigned RNAV STARs.

23.6 DEPARTING AIRCRAFT FROM SINGAPORE CHANGI AIRPORT

23.6.1 DEPARTURE SPEED CONTROL
Departing aircraft shall not exceed IAS 230 knots below 4,000 feet AMSL or at the waypoints specified in the SID and not exceed IAS 250 knots below 10,000 feet AMSL. Pilots shall also comply with speed control restrictions according to published SIDs.

24 SIMULTANEOUS INDEPENDENT PARALLEL APPROACHES

24.1 INTRODUCTION

24.1.1 Simultaneous independent parallel approaches will be implemented daily between 0000UTC and 1500UTC to optimize runway utilization and enhance air traffic efficiency.

24.2 PROCEDURES FOR SIMULTANEOUS INDEPENDENT PARALLEL APPROACHES

24.2.1 To ensure safe operations between aircraft on parallel approaches, Normal Operating Zones (NOZs) are established for each extended runway centreline and a No Transgression Zone (NTZ) is established between the NOZs.

24.2.2 ATC will vector arriving flights into Singapore Changi Airport from the final waypoint of the respective STARs to the respective NOZs.

24.2.3 Within the NOZ, ATC shall provide a minimum vertical separation of 1,000ft or 3NM surveillance separation between pairs of aircraft until both aircraft are established on the ILS Localizer course.

24.2.4 ATC is not required to provide separation between aircraft on adjacent ILS Localizers and will monitor aircraft for deviation from the approach path.

24.2.5 Aircraft can expect to maintain altitude 2,500ft till Glide Path Interception for Runway 20R / 02L and 3,500ft till Glide Path Interception for Runway 20C / 02C. This is to ensure the necessary vertical separation prior to establishing on the respective ILS Localizer course.

24.2.6 Aircraft can expect the following radiotelephony phraseology to intercept the Localizer before clearing for ILS:

“TURN LEFT (RIGHT) HEADING (three digits) MAINTAIN (altitude) REPORT ESTABLISHED ON THE LOCALIZER RUNWAY (number) LEFT (CENTRE / RIGHT)”

followed by ...

"MAINTAIN (altitude), CLEARED FOR ILS APPROACH RUNWAY (number) LEFT (CENTRE/RIGHT)"

WSSS AD 2.25 VISUAL SEGMENT SURFACE (VSS) PENETRATION

NIL (not applicable).

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AERODROME CHART - ICAO

01 21' 33"N
103°59' 22"E

AERODROME ELEVATION 6.66m

TWR	118.6 / 118.25 / 131.4
GND	124.3 / 121.85 / 121.725 / 127.275
DELIVERY	121.65 / 119.6

RAMP TWR	
GND	122.55 (GMC 4 EAST) 125.65 (GMC 4 WEST)

SINGAPORE/SINGAPORE CHANGI

PAPI 3° (MEHT) *

Pilot's eye height over the threshold when the following PAPI lights come into view.	RUNWAY					
	02L	20R	02C	20C	02R	20L
2 White lights and 2 red lights	20.0m	19.5m	19.8m	19.8m	19.7m	19.7m
3 White lights and 1 red light	24.0m	23.3m	23.7m	23.7m	23.6m	23.6m
4 White lights	26.4m	25.7m	26.2m	26.2m	26.0m	26.0m

* MEHT .Minimum Eye Height Over the Threshold.

Note .Aircraft with eye-to-wheel height greater than 8 metres are advisable to fly with 2 white lights and 2 red lights visible so as to achieve sufficient wheel clearance.

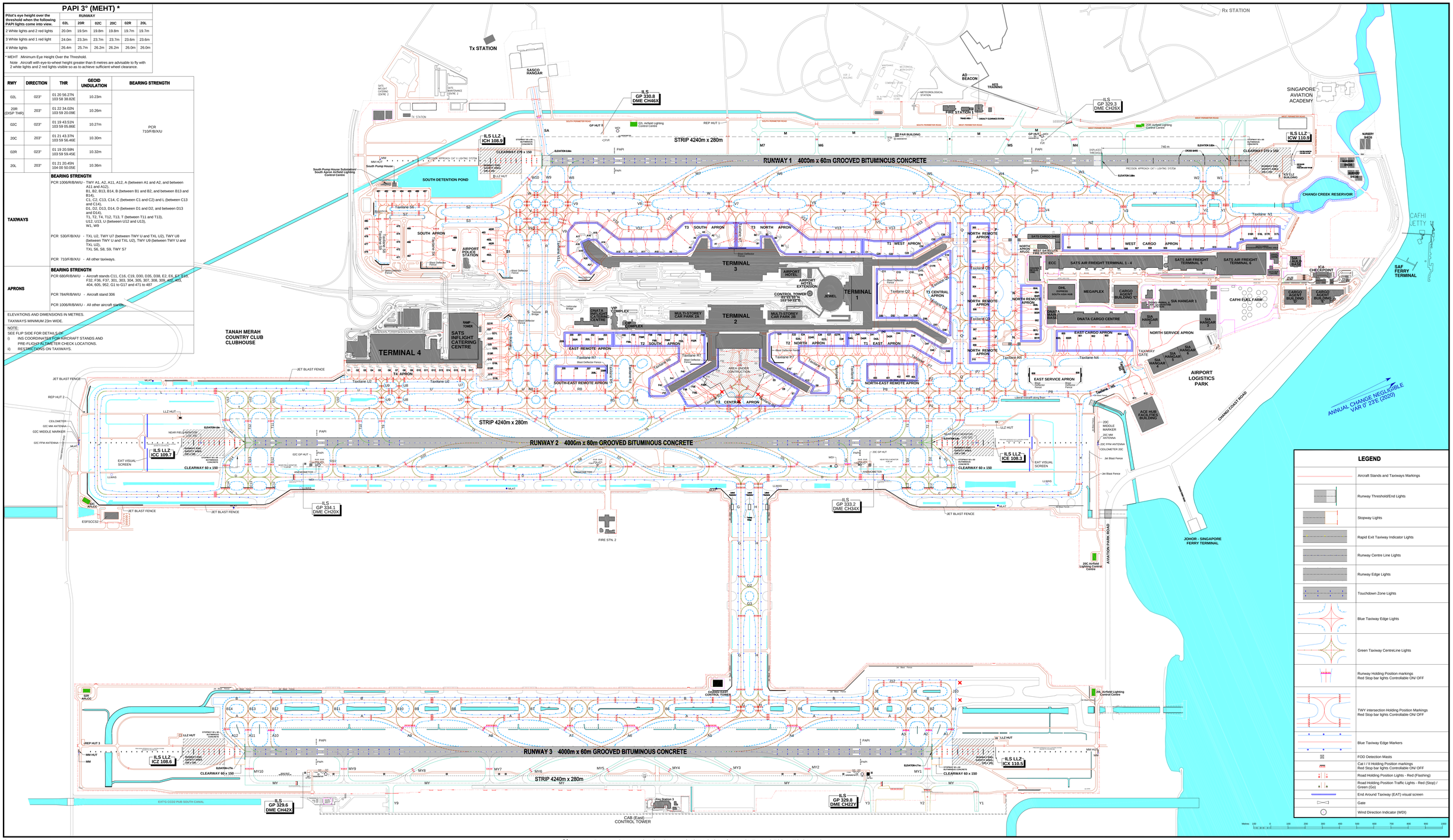
RWY	DIRECTION	THR	GEOID UNDULATION	BEARING STRENGTH
02L	023°	01 20 56.27N 103 58 38.82E	10.23m	PCR 710/F/B/X/U
20R (DISP THR)	203°	01 22 34.02N 103 59 20.09E	10.26m	
02C	023°	01 19 43.51N 103 59 05.86E	10.27m	
20C	203°	01 21 43.37N 103 59 56.46E	10.30m	
02R	023°	01 19 20.59N 103 59 59.45E	10.32m	
20L	203°	01 21 20.45N 104 00 50.05E	10.36m	

TAXIWAYS	**BEARING STRENGTH** PCR 1006/R/B/W/U - TWY A1, A2, A11, A12, A (between A1 and A2, and between A11 and A12), B1, B2, B13, B14, B (between B1 and B2, and between B13 and B14), C1, C2, C13, C14, C (between C1 and C2) and L (between C13 and C14), D1, D2, D13, D14, D (between D1 and D2, and between D13 and D14), T1, T2, T4, T12, T13, T (between T11 and T13), U12, U13, U (between U12 and U13), W1, W9 PCR 530/F/B/X/U - TXL U2, TWY U7 (between TWY U and TXL U2), TWY U8 (between TWY U and TXL U2), TWY U9 (between TWY U and TXL U2), TXL S6, S8, S9, TWY S7 PCR 710/F/B/X/U - All other taxiways.
APRONS	**BEARING STRENGTH** PCR 680/R/B/W/U - Aircraft stands C11, C16, C19, D30, D35, D38, E2, E6, E7, E10, F32, F36, F37, 301, 303, 304, 305, 307, 308, 309, 402, 403, 404, 605, 952, G1 to G17 and 471 to 487 PCR 784/R/B/W/U - Aircraft stand 306 PCR 1006/R/B/W/U - All other aircraft stands.

ELEVATIONS AND DIMENSIONS IN METRES.

TAXIWAYS MINIMUM 23m WIDE.

NOTE:
SEE FLIP SIDE FOR DETAILS OF
i) INS COORDINATES FOR AIRCRAFT STANDS AND PRE-FLIGHT ALTIMETER CHECK LOCATIONS.
ii) RESTRICTIONS ON TAXIWAYS.



Changes : Removed annotation for decommissioned aircraft stands E1 and F30 at T2 Central Apron.

INS COORDINATES FOR AIRCRAFT STANDS AND PRE-FLIGHT ALTIMETER CHECK LOCATIONS

LOCATION	STAND NR	NORTH LAT	EAST LONG	ELEVATION
T3 SOUTH APRON	A1	01 21 21.52	103 59 06.25	4.75m (15.58ft)
	A2	01 21 21.75	103 59 04.00	4.65m (15.26ft)
	A3	01 21 19.86	103 59 02.79	4.66m (15.29ft)
	A4	01 21 17.61	103 59 02.54	4.79m (15.72ft)
	A5	01 21 15.50	103 59 03.62	4.86m (15.94ft)
	A9	01 21 12.56	103 59 03.65	5.02m (16.47ft)
	A10	01 21 10.34	103 59 02.40	5.04m (16.54ft)
	A11	01 21 07.93	103 59 01.41	5.25m (17.22ft)
	A12	01 21 05.76	103 59 00.49	5.38m (17.65ft)
	A13	01 21 03.59	103 58 59.58	5.48m (17.98ft)
	A14	01 21 01.66	103 58 57.59	5.57m (18.27ft)
	A15	01 21 00.77	103 58 55.41	5.46m (17.91ft)
	A16	01 20 59.27	103 58 54.20	5.51m (18.08ft)
	A17	01 20 57.25	103 58 54.06	5.23m (17.16ft)
	A18	01 20 55.67	103 58 55.25	5.37m (17.62ft)
	A19	01 20 55.26	103 58 57.13	5.40m (17.72ft)
	A20	01 20 56.09	103 58 58.83	5.45m (17.88ft)
	A21	01 20 57.10	103 59 00.80	5.49m (18.01ft)
T3 NORTH APRON	B1	01 21 26.86	103 59 08.37	4.82m (15.81ft)
	B2	01 21 28.18	103 59 06.82	4.68m (15.35ft)
	B3	01 21 30.33	103 59 07.30	4.65m (15.26ft)
	B4	01 21 32.03	103 59 08.60	4.75m (15.58ft)
	B5	01 21 32.98	103 59 10.89	4.80m (15.75ft)
	B6	01 21 35.15	103 59 13.16	4.96m (16.27ft)
	B7	01 21 37.65	103 59 13.93	4.97m (16.31ft)
	B8	01 21 39.94	103 59 15.20	5.13m (16.83ft)
	B9	01 21 42.19	103 59 16.16	5.13m (16.83ft)
	B10	01 21 44.47	103 59 17.12	5.15m (16.90ft)
T1 WEST APRON	C1	01 21 46.75	103 59 18.08	5.09m (16.70ft)
	C20	01 21 48.83	103 59 19.23	5.08m (16.67ft)
	C22	01 21 51.00	103 59 20.13	5.15m (16.90ft)
	C23	01 21 53.56	103 59 20.77	5.08m (16.67ft)
	C24	01 21 56.54	103 59 20.97	4.89m (16.04ft)
	C25	01 21 59.12	103 59 20.59	4.99m (16.37ft)
	C26	01 22 01.48	103 59 20.76	5.01m (16.44ft)
T1 CENTRAL APRON	C11	01 21 47.42	103 59 23.82	5.09m (16.70ft)
	C13	01 21 49.63	103 59 24.75	5.03m (16.50ft)
	C15	01 21 51.89	103 59 25.70	5.06m (16.60ft)
	C16	01 21 53.47	103 59 26.62	4.86m (15.94ft)
	C17	01 21 55.50	103 59 26.20	5.01m (16.44ft)
	C17L	01 21 54.75	103 59 26.22	4.96m (16.27ft)
	C17R	01 21 56.01	103 59 25.68	5.12m (16.80ft)
	C18	01 21 57.86	103 59 25.75	4.99m (16.37ft)
	C19	01 21 59.79	103 59 25.63	4.95m (16.24ft)
	D30	01 21 44.54	103 59 30.14	5.08m (16.67ft)
	D32	01 21 46.75	103 59 31.08	5.08m (16.67ft)
	D34	01 21 49.03	103 59 32.04	5.07m (16.63ft)
	D35	01 21 50.87	103 59 32.82	5.02m (16.47ft)
	D36	01 21 51.98	103 59 34.62	5.06m (16.60ft)
	D37	01 21 53.37	103 59 36.28	4.97m (16.31ft)
	D38	01 21 54.58	103 59 37.77	4.99m (16.37ft)
T1 EAST APRON	D40	01 21 38.13	103 59 32.89	5.11m (16.77ft)
	D40L	01 21 37.38	103 59 32.83	5.09m (16.70ft)
	D40R	01 21 38.77	103 59 32.84	5.13m (16.83ft)
	D41	01 21 40.30	103 59 33.81	5.07m (16.63ft)
	D42	01 21 42.77	103 59 34.58	5.15m (16.89ft)
	D42L	01 21 42.00	103 59 34.47	5.12m (16.79ft)
	D42R	01 21 43.45	103 59 34.44	5.21m (17.09ft)
	D44	01 21 44.97	103 59 35.44	5.14m (16.86ft)
	D46	01 21 47.40	103 59 36.72	5.08m (16.67ft)
	D47	01 21 49.19	103 59 38.89	4.93m (16.17ft)
	D48	01 21 50.60	103 59 40.77	4.97m (16.31ft)
	D49	01 21 52.23	103 59 42.35	4.98m (16.34ft)
T2 NORTH APRON	E8	01 21 27.99	103 59 38.45	4.68m (15.35ft)
	E10	01 21 24.12	103 59 32.64	4.75m (15.58ft)
	E11	01 21 25.57	103 59 34.37	4.78m (15.68ft)
	E12	01 21 27.20	103 59 36.42	4.75m (15.58ft)
	E20	01 21 24.36	103 59 27.08	5.04m (16.54ft)
	E22	01 21 26.64	103 59 28.04	5.07m (16.63ft)
	E24	01 21 29.01	103 59 29.06	5.09m (16.70ft)
	E24L	01 21 28.32	103 59 28.77	5.10m (16.73ft)
	E24R	01 21 29.53	103 59 29.28	5.08m (16.67ft)
	E26	01 21 31.19	103 59 29.96	5.08m (16.67ft)
	E27	01 21 33.56	103 59 30.96	5.07m (16.62ft)
	E27L	01 21 32.79	103 59 30.86	5.03m (16.48ft)
	E27R	01 21 34.20	103 59 30.91	5.12m (16.80ft)
	E28	01 21 35.74	103 59 31.89	5.08m (16.67ft)

INS COORDINATES FOR AIRCRAFT STANDS AND PRE-FLIGHT ALTIMETER CHECK LOCATIONS

LOCATION	STAND NR	NORTH LAT	EAST LONG	ELEVATION
T2 CENTRAL APRON	E2	01 21 19.28	103 59 27.30	4.90m (16.08ft)
	E3	01 21 18.44	103 59 29.27	4.82m (15.81ft)
	E4	01 21 18.10	103 59 31.70	4.80m (15.75ft)
	E5	01 21 19.56	103 59 33.72	4.90m (16.08ft)
	E6	01 21 21.22	103 59 35.93	4.84m (15.88ft)
	E7	01 21 22.48	103 59 37.46	4.73m (15.52ft)
	F31	01 21 13.87	103 59 25.30	4.91m(16.11ft)
	F32	01 21 13.03	103 59 27.26	4.85m (15.91ft)
	F33	01 21 11.30	103 59 28.54	4.91m (16.11ft)
	F34	01 21 08.98	103 59 28.96	4.92m (16.14ft)
	F35	01 21 06.60	103 59 29.55	4.91m (16.11ft)
	F35L	01 21 06.06	103 59 30.13	4.74m (15.55ft)
	F35R	01 21 06.96	103 59 29.05	5.04m (16.54ft)
	F36	01 21 04.34	103 59 29.67	4.82m (15.81ft)
T2 SOUTH APRON	F37	01 20 59.83	103 59 27.87	4.75m (15.58ft)
	F40	01 21 05.62	103 59 25.34	4.85m (15.91ft)
	F41	01 21 03.19	103 59 25.58	4.82m (15.81ft)
	F42	01 21 00.61	103 59 25.96	4.72m (15.49ft)
	F50	01 21 10.69	103 59 21.32	5.03m (16.50ft)
	F52	01 21 08.51	103 59 20.40	5.11m (16.77ft)
	F52L	01 21 07.82	103 59 20.11	5.16m (16.93ft)
	F52R	01 21 09.04	103 59 20.62	5.08m (16.67ft)
	F54	01 21 06.14	103 59 19.40	5.22m (17.13ft)
	F56	01 21 03.96	103 59 18.48	5.30m (17.39ft)
	F56L	01 21 03.27	103 59 18.18	5.42m (17.78ft)
	F56R	01 21 04.49	103 59 18.70	5.34m (17.52ft)
	F58	01 21 01.58	103 59 17.47	5.49m (18.01ft)
	F59	01 20 59.41	103 59 16.55	5.64m (18.50ft)
	F59L	01 20 58.72	103 59 16.26	5.67m (18.60ft)
	F59R	01 20 59.93	103 59 16.78	5.60m (18.37ft)
	F60	01 20 59.91	103 59 15.50	5.77m (18.93ft)
EAST REMOTE APRON	200	01 20 47.83	103 59 11.67	6.23m (20.44ft)
	200L	01 20 46.91	103 59 11.92	6.29m (20.64ft)
	200R	01 20 48.35	103 59 11.89	6.18m (20.28ft)
	201	01 20 49.99	103 59 12.62	5.96m (19.55ft)
	202	01 20 52.34	103 59 13.57	5.94m (19.49ft)
	202L	01 20 51.65	103 59 13.28	5.76m (18.90ft)
	202R	01 20 52.87	103 59 13.79	5.73m (18.80ft)
	203	01 20 54.52	103 59 14.47	5.92m (19.42ft)
SOUTH-EAST REMOTE APRON	205	01 20 43.91	103 59 17.06	4.77m (15.65ft)
	206	01 20 46.08	103 59 17.98	4.76m (15.62ft)
	207	01 20 48.21	103 59 19.01	4.74m (15.55ft)
	208	01 20 50.68	103 59 20.05	4.75m (15.58ft)
	208L	01 20 50.01	103 59 19.76	4.74m (15.55ft)
	208R	01 20 51.25	103 59 20.29	4.73m (15.42ft)
NORTH REMOTE APRON	300	01 22 06.95	103 59 22.67	4.53m (14.86ft)
	301	01 22 06.41	103 59 24.69	4.93m (16.17ft)
	302	01 22 05.21	103 59 26.75	4.97m (16.31ft)
	303	01 22 03.55	103 59 31.40	5.32m (17.45ft)
	304	01 22 02.84	103 59 33.06	5.35m (17.55ft)
	305	01 22 02.14	103 59 34.71	5.30m (17.39ft)
	306	01 22 01.41	103 59 36.42	5.16m (16.93ft)
	307	01 21 59.39	103 59 40.36	5.16m (16.93ft)
	308	01 21 58.96	103 59 41.35	5.10m (16.73ft)
	309	01 21 58.52	103 59 43.17	5.06m (16.60ft)
	310	01 21 57.42	103 59 44.96	4.74m (15.55ft)
	951	01 22 09.35	103 59 45.23	5.15m (16.90ft)
	951L	01 22 08.91	103 59 44.27	5.00m (16.40ft)
	951R	01 22 08.35	103 59 45.58	5.00m (16.40ft)
	952	01 22 09.94	103 59 42.65	4.89m (16.04ft)
	953	01 22 11.22	103 59 40.85	4.98m (16.34ft)
	953L	01 22 10.78	103 59 39.89	4.83m (15.85ft)
	953R	01 22 10.41	103 59 41.28	4.87m (15.98ft)
	954	01 22 12.46	103 59 37.95	4.84m (15.88ft)
	954L	01 22 12.02	103 59 36.99	4.70m (15.42ft)
	954R	01 22 11.65	103 59 38.38	4.74m (15.55ft)
NORTH-EAST REMOTE APRON	400	01 21 38.71	103 59 40.14	4.31m (14.14ft)
	401	01 21 40.98	103 59 41.10	4.31m (14.14ft)
	402	01 21 42.85	103 59 41.89	4.30m (14.11ft)
	403	01 21 44.37	103 59 42.53	4.29m (14.07ft)
	404	01 21 45.45	103 59 42.98	4.20m (13.78ft)

INS COORDINATES FOR AIRCRAFT STANDS AND PRE-FLIGHT ALTIMETER CHECK LOCATIONS

LOCATION	STAND NR	NORTH LAT	EAST LONG	ELEVATION
WEST CARGO APRON	502	01 22 22.23	103 59 31.62	4.35m (14.27ft)
	503	01 22 24.98	103 59 32.78	4.29m (14.07ft)
	504	01 22 27.26	103 59 33.74	4.29m (14.07ft)
	505	01 22 29.54	103 59 34.70	4.32m (14.17ft)
	506	01 22 31.81	103 59 35.66	4.38m (14.37ft)
	507	01 22 34.11	103 59 36.64	4.36m (14.30ft)
	508	01 22 36.41	103 59 37.61	4.29m (14.07ft)
	509	01 22 39.12	103 59 38.76	4.09m (13.42ft)
	510	01 22 41.37	103 59 40.18	4.19m (13.75ft)
	511	01 22 43.54	103 59 41.09	4.22m (13.85ft)
	512	01 22 45.71	103 59 42.01	4.24m (13.91ft)
	513	01 22 47.89	103 59 42.92	4.26m (13.98ft)
	514	01 22 50.19	103 59 43.54	4.36m (14.30ft)
	515	01 22 52.90	103 59 43.20	4.09m (13.43ft)
	516	01 22 55.39	103 59 43.97	4.04m (13.26ft)
	516L	01 22 56.24	103 59 43.80	3.96m (12.98ft)
	516R	01 22 54.93	103 59 43.25	3.95m (12.97ft)
	517	01 22 58.02	103 59 45.08	4.05m (13.27ft)
	517L	01 22 58.83	103 59 44.99	3.98m (13.05ft)
	517R	01 22 57.55	103 59 44.35	3.96m (12.98ft)
EAST CARGO APRON	600	01 22 14.12	103 59 48.10	4.25m (13.94ft)
	600L	01 22 13.28	103 59 48.27	4.22m (13.83ft)
	600R	01 22 14.58	103 59 48.81	4.15m (13.60ft)
	601	01 22 16.52	103 59 49.27	4.27m (14.01ft)
	602	01 22 18.80	103 59 50.23	4.30m (14.11ft)
	603	01 22 21.15	103 59 51.02	4.29m (14.07ft)
	604	01 22 23.46	103 59 51.99	4.31m (14.14ft)
	605	01 22 25.19	103 59 52.75	4.27m (14.01ft)
EAST SERVICE APRON	606	01 22 07.00	103 59 52.53	2.41m (7.91ft)
	609	01 22 12.95	103 59 55.04	2.85m (9.35ft)
ACEHUB	611	01 22 22.14	104 00 02.87	4.01m (13.16ft)
	612	01 22 24.50	104 00 02.87	3.91m (12.83ft)
SOUTH APRON	461	01 20 39.67	103 58 52.75	5.28m (17.32ft)
	462	01 20 40.69	103 58 50.37	5.75m (18.86ft)
	462L	01 20 40.41	103 58 51.02	5.48m (17.98ft)
	462R	01 20 40.97	103 58 49.71	5.71m (18.73ft)
	463	01 20 41.80	103 58 47.76	5.97m (19.59ft)
	463L	01 20 41.52	103 58 48.42	5.82m (19.10ft)
	463R	01 20 42.06	103 58 47.17	5.82m (19.10ft)
	464	01 20 32.33	103 58 49.39	4.98m (16.34ft)
	465	01 20 33.61	103 58 47.20	5.01m (16.44ft)
	466	01 20 34.53	103 58 45.05	5.01m (16.44ft)
	467	01 20 27.32	103 58 45.73	5.01m (16.44ft)
	468	01 20 28.34	103 58 43.34	5.00m (16.41ft)
	469	01 20 29.36	103 58 40.96	5.02m (16.47ft)
	471	01 20 23.76	103 58 44.49	5.16m (16.93ft)
	472	01 20 24.55	103 58 43.24	5.16m (16.93ft)
	473	01 20 25.12	103 58 41.90	5.16m (16.93ft)
	474	01 20 25.70	103 58 40.56	5.16m (16.93ft)
	475	01 20 26.27	103 58 39.22	5.16m (16.93ft)
	476	01 20 19.16	103 58 41.47	5.16m (16.93ft)
	477	01 20 19.74	103 58 40.13	5.16m (16.93ft)
	478	01 20 20.31	103 58 38.79	5.16m (16.93ft)
	479	01 20 20.88	103 58 37.45	5.16m (16.93ft)
	480	01 20 21.45	103 58 36.11	5.16m (16.93ft)
	481	01 20 25.27	103 58 32.56	5.22m (17.13ft)
	482	01 20 26.62	103 58 33.13	5.22m (17.13ft)
	483	01 20 27.96	103 58 33.70	5.22m (17.13ft)
	484	01 20 29.31	103 58 34.27	5.22m (17.13ft)
	485	01 20 30.66	103 58 34.84	5.22m (17.13ft)
	486	01 20 32.01	103 58 35.41	5.22m (17.13ft)
	487	01 20 33.36	103 58 35.98	5.22m (17.13ft)
T4 APRON	G1	01 20 07.58	103 59 00.97	3.95m (12.96ft)
	G2	01 20 08.88	103 59 01.52	3.95m (12.96ft)
	G3	01 20 10.18	103 59 02.07	3.95m (12.96ft)
	G4	01 20 11.48	103 59 02.62	3.94m (12.93ft)
	G5	01 20 12.77	103 59 03.17	3.94m (12.93ft)
	G6	01 20 14.49	103 59 03.89	3.93m (12.89ft)
	G7	01 20 15.70	103 59 04.57	3.89m (12.76ft)
	G8	01 20 17.01	103 59 05.12	3.85m (12.63ft)
	G9	01 20 18.31	103 59 05.67	3.85m (12.63ft)
	G10	01 20 19.60	103 59 06.22	3.86m (12.66ft)
	G11	01 20 20.90	103 59 06.77	3.84m (12.60ft)
	G12	01 20 22.20	103 59 07.31	3.83m (12.57ft)
	G13	01 20 23.50	103 59 07.86	3.82m (12.53ft)
	G14	01 20 24.79	103 59 08.41	3.83m (12.57ft)
	G15	01 20 26.09	103 59 08.96	3.88m (12.73ft)
	G16	01 20 27.39	103 59 09.50	4.05m (13.29ft)
	G17	01 20 28.69	103 59 10.05	4.00m (13.12ft)
	G18	01 20 31.53	103 59 11.86	4.36m (14.30ft)
	G18L	01 20 32.05	103 59 12.85	4.34m (14.24ft)
	G18R	01 20 31.65	103 59 11.26	4.43m (14.53ft)
	G19	01 20 32.64	103 59 09.25	4.56m (14.96ft)
	G19L	01 20 33.17	103 59 10.25	4.47m (14.67ft)
	G19R	01 20 32.77	103 59 08.66	4.56m (14.96ft)
	G20	01 20 33.75	103 59 06.65	4.52m (14.83ft)
	G20L	01 20 34.13	103 59 07.58	4.44m (14.57ft)
	G20R	01 20 33.99	103 59 06.10	4.52m (14.83ft)
	G21	01 20 34.87	103 59 04.04	4.51m (14.80ft)
	G21L	01 20 35.24	103 59 04.98	4.52m (14.83ft)
	G21R	01 20 35.10	103 59 03.49	4.55m (14.93ft)

RESTRICTIONS ON TAXIWAYS

1) Pilots are advised to apply minimum thrust when
   i) turning into TWY P2, P4, P5 and Taxilane P6 while taxiing either northwards or southwards on Taxilane P7, and
   ii) thereafter when taxiing along TWY P2 up to and including the TWY P8/P2 junction.
   This is in view of apron activities at aircraft stands D40, D41, D47, D48, D49, E22, E24, E27 and E28.

2) TWY SA can only be used by aircraft with maximum wingspan 65m. TWY SA is a one-way live TWY for aircraft taxiing into SASCO hangar via RWY 02L. Only tow-out operation is allowed from SASCO hangar into TWY SA and RWY 02L.

3) Taxiway Q (between TWY V and TWY P7) can only be used by aircraft with maximum wingspan 65m.

4) Taxiway centreline along TWY T between TWY R1 and R3 offset eastward by 2.5m away from aircraft stands E7 and F36

5) Pilots are advised to apply minimum thrust when turning into Taxiway V from Taxilane V7.

6) Taxilane V11 (behind aircraft stands A18 to A21) can only be used by aircraft with maximum wingspan 61m.

7) Taxilane Q1 (behind aircraft stands C16 to C19 and between TWY P and TWY Q),
   Taxilane Q2 and Taxilane Q3 (behind aircraft stands D35 to D38 and between TWY P and TWY Q)
   can only be used by aircraft with maximum wingspan 65m.

8) Taxilane P7 (behind aircraft stands E20 to E22) and Taxilane R7 (behind aircraft stands F50 to F54) can only be used by aircraft with maximum wingspan 65m (towing and pushback exempted).

9) Taxilane U2 can only be used by aircraft with maximum wingspan 36m.

10) Taxiway U7 (between Taxilane U2 and Taxiway U), Taxiway U8 (between Taxilane U2 and Taxiway U) and Taxiway U9 (between Taxilane U2 and Taxiway U) can only be used by aircraft with maximum wingspan 36m.

11) Pilots are advised to exercise caution when taxiing near Taxilane U2, Taxiway U, U7, U8 and U9.

12) Pilots are advised to apply speed limit of 20 knots when taxiing along TWY R and TWY S.

13) Pilots turning aircraft into aircraft stand A2 or aircraft stand B2 are advised to wait for any aircraft holding at Taxilane V7, at the inner cul-de-sac portion of the terminal building to vacate this portion before turning into aircraft stand A2 or aircraft stand B2.

14) TWY M, M4, M5, M6 and M7, located western side of RWY 02L/20R, are solely for use by Republic of Singapore Air Force (RSAF) aircraft.

15) TWY MY, MY1, MY2, MY3, MY4, MY5, MY6, MY7, MY8, MY9 and MY10, located eastern side of RWY 02R/20L, are solely for use by Republic of Singapore Air Force (RSAF) aircraft.

16) Taxiway S2, S3 and Taxilane S4 can only be used by aircraft with maximum wingspan 65m.

17) Taxilane S6, S8, S9 and Taxiway S7 can only be used by aircraft with maximum wingspan 36m.

18) Pilots are advised to apply minimum thrust when taxiing on Taxilane N4 turning into Taxilane N5 (and vice versa), due to potential jet blast issues affecting Bays 603, 604, 611 and 612. Aircraft shall not stop on TXL N5 between aircraft stands 604 and 611.

NOTE:
Pilots to follow stand lead-in line and taxi through white hatched apron markings of the following aircraft stands:
A5, A9, B5, B6, C17, D40, D42, E24, E27, F35, F52, F56, F59, G18, G19, G20, G21, 200, 202, 208, 462, 463, 600, 516, 517, 951, 953, 954.

RADIO ALTIMETER OPERATIONS AREA

A radio altimeter operating area is established in the pre-threshold area of Runway 02L/20R, Runway 02C/20C and Runway 02R/20L.
The size of the radio altimeter operating area is 300m length and 120m width.

AIRCRAFT STANDS WITH SAFEGATE AIRCRAFT DOCKING GUIDANCE SYSTEM.

Changes : Operation of safegate aircraft docking guidance system on aircraft stands 951 to 954 at North Remote Apron, and aircraft stands 461 to 469 at South Apron.

WSSL SINGAPORE / SELETAR

WSSL AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WSSL - SINGAPORE / SELETAR

WSSL AD 2.2 AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA

1	*ARP Coordinates and Site at AD*	01 25 01 N 103 52 04 E
2	*Direction and distance from (city)*	006°, 14.6km from city centre (The Fullerton Hotel , Singapore)
3	*Elevation/Reference Temperature*	14 M(46ft) / 33.3°C
4	*Geoid Undulation*	9.78 M
5	MAG VAR	0°23' E (2020)
6	*AD Administration, Address, Telephone, Telefax, AFS*	Address: CHANGI AIRPORT GROUP (S) PTE LTD SELETAR AIRPORT 21 Seletar Aerospace Road 1 Singapore 797405 TEL: (65)64812909, Fax: (65)64833044 (AIS) TEL: (65)64812893, Fax: (65)64831656 (Control Tower) TEL: (65)64815077, 97533361 FAX: (65)64831754 (Airside Operations) AFS: WSSLYDYX
7	*Types of Traffic Permitted*	IFR and VFR
8	*Remarks*	a) Scheduled Closure Periods for RWY 03/21: see AIP section WSSL AD 2.12 item 14 i). b) Night flight restriction for noise abatement purpose (see AIP section WSSL AD 2.21). c) PPR for aircraft not equipped with RTF. d) A subsonic jet aircraft, unless otherwise exempted, is not permitted to operate in Singapore unless it possesses a noise certificate stating that it meets the noise standards of ICAO Annex 16, Volume 1, Chapter 3, or equivalent. The noise certificate may also take the form of a suitable statement contained in another document approved by the State of Registry of the aircraft. e) Direct transit area. Overnight transit in Singapore city. f) All arriving and departing aircraft are required to appoint a licensed Ground Handling Agent (GHA). List of Seletar GHAs can be downloaded from URL - http://www.seletarairport.com/ ground-handling-agents-at-seletar-airport.html g) For non-scheduled flights, all passengers and crews are required to clear Customs and Immigration at Seletar Business Aviation Centre (SBAC)

WSSL AD 2.3 OPERATIONAL HOURS

1	*Aerodrome Administration*	H24	5	*ATS Reporting Office*	H24
2	*Customs and Immigration*	H24	6	*MET Briefing Office*	H24
3	*Health and Sanitation*	H24	7	*Air Traffic Services*	H24
4	*AIS Self-Briefing Office*	H24	8	*Apron Control Office*	H24

WSSL AD 2.4 HANDLING SERVICES AND FACILITIES

1	*Cargo Handling Facilities*	Provided by handling agent.
2	*Fuel / Oil Types*	AVGAS 100LL, JET A1

3	*Fuelling Facilities / Capacity*	SUN/MON to THU/FRI BTN 2330-1400; SAT, SUN and Public holidays BTN 0030-0930 Contact during operating hours: TEL: (65)68538320 (Operations Room) Contact after operating hours: TEL: (65)82009899 (H24 Operations Mobile) FAX: (65)64839246 Group email: GX-SAV-Seletar-Operations24by7@shell.com PPP link: http://www.shell.com/business-customers/aviation/ppp.html
4	*Hangar space for visiting aircraft*	By arrangement with handling agent.
5	*Repair facilities for visiting aircraft*	By arrangement with handling agent.
6	*Remarks*	NIL

WSSL AD 2.5 PASSENGER FACILITIES

1	*Hotels*	NIL
2	*Restaurants*	Public area of terminal building
3	*Transportation*	Handling agent provides its own transport service for passengers and crew between airport and city. Public buses and private hired taxis are available at airport terminal.
4	*Medical Facilities*	NIL
5	*Bank and Post Office*	NIL
6	*Tourist Office*	NIL
7	*Remarks*	Internet address : http://www.seletarairport.com / for airport and flight information, facilities and services.

WSSL AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

1	*AD category for fire fighting*	CAT7 (No facilities for foaming of runways).
2	*Rescue equipment*	Adequately provided as recommended by ICAO.
3	*Capability for removal of disabled aircraft*	Up to B757-200. Contact Seletar Airside Operations at: +65 64815077 or +65 97533361
4	*Remarks*	All Airport Emergency Service personnel are trained in rescue and fire-fighting as well as medical first-aid.

WSSL AD 2.7 SEASONAL AVAILABILITY - CLEARING

The aerodrome is available throughout the year

WSSL AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

1	*Apron surface and strength*	Surface: Concrete (all other aircraft stands) Strength: PCR 432 / R /C/ W / U	
2	Taxiway width, surface and strength	Width:	23 M (75.5ft), 18 (59.1ft)TWY EC4, EC5 AND EC6
			8 M (26.2ft) TWY WS1 and WS2
		Surface: Bituminous concrete	
		Strength: PCR 423/F/C/X/U	
3	*Remarks : NIL*		

AERODROME CHART - ICAO

01° 25' 01.04"N
103° 52' 03.52"E

ELEV 14m

TWR	118.45
	121.6

SINGAPORE/SELETAR

RWY	DIRECTION	THR	RUNWAY BEARING STRENGTH
03	033°	01 24 30.85N 103 51 43.79E	PCR 423/F/C/X/U
21	213°	01 25 20.79N 103 52 16.43E	
TAXIWAYS		BEARING STRENGTH PCR 423 F/C/X/U - All taxiways.	
APRONS		BEARING STRENGTH PCR 432/R/C/W/U - All aircraft stands.	

ELEVATIONS AND DIMENSIONS IN METRES

VAR 0°23'E (2020)
ANNUAL CHANGE NEGLIGIBLE

Pulau Punggol Barat

RESA 240 x 150m
CWY 60 x 150m
ELEV 5
WDI ANEMOMETER
Fuel Farm
FOKKER
JET AVIATION
SELETAR WEST LINK
AP IBN Flg G 'SL'
WEST SUBSTATION WEST AFLCC
ST AEROSPACE ENGINEERING
Ground Run Enclosure
GP Antenna
PAPI 3.5°
Paved Shoulder
GROOVED BITUMINOUS CONCRETE
1836m X 46m
STRIP 1956m X 150m
Compass Swing Area
SELETAR PASSENGER TERMINAL
ABN Altn Flg W & G every 2.5 sec
SELETAR AEROSPACE ROAD
WEST CAMP ROAD
SY/FC
WDI
PAPI 3.2°
F/S METER
RVR
ANEMOMETER
CONTROL TWR
AIS, MET, FIRE STATION
EAST AFLCC
Helicopter Landing Area (Closed)
(Restricted to normal landing and take-off operations only. Running landing not allowed due to unsuitable ground condition.)
SELETAR AEROSPACE DRIVE
CWY 60 x 150m
RESA 240 x 92m
ELEV 14
LOCALISER
LLZ BDLG
BELL HELICOPTER
BOMBARDIER

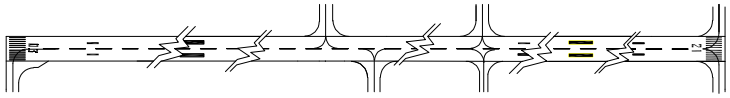
Metres
100 0 100 200 300
400 0 400 800 1200
Feet

LEGEND	
AIRCRAFT STAND	C8
Taxiway Centre Line Lights	
Runway Edge Lights (No Runway Centreline Lights provided)	
Taxiway Edge Lights	
TAXI HOLDING POSITION	
STOP BAR	
MAST FOR WIND MONITORING SYSTEM	⊗
THRESHOLD IDENTIFICATION LIGHTS 15m FROM RUNWAY EDGES	•

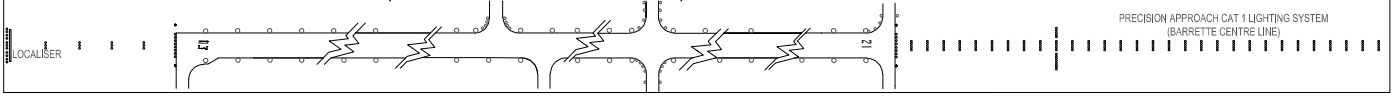
PAPI 3.2°(RWY 03)/3.5°(RWY21) (MEHT) *		
Pilot's eye height over the threshold when the following PAPI lights come into view.	RUNWAY 03	21
2 White lights and 2 Red lights	21.24m	17.720m
3 White lights and 1 Red lights	22.27m	19.286m
4 White lights	24.75m	20.871m

* MEHT : MInimum Eye Height Over the Threshold
Note Aircraft with eye-to-wheel height greater than 6.3 metres are advised to fly with 2 white lights and 2 red lights visible so as to achieve sufficient wheel clearance.

MARKING AIDS RWY 03/21 AND EXIT TWY



LIGHTING AIDS RWY 03/21 AND EXIT TWY (NO RWY CENTRELINE LIGHTS PROVIDED)



CHANGES : Added Ground Run Enclosure annotation near TWY EC1.

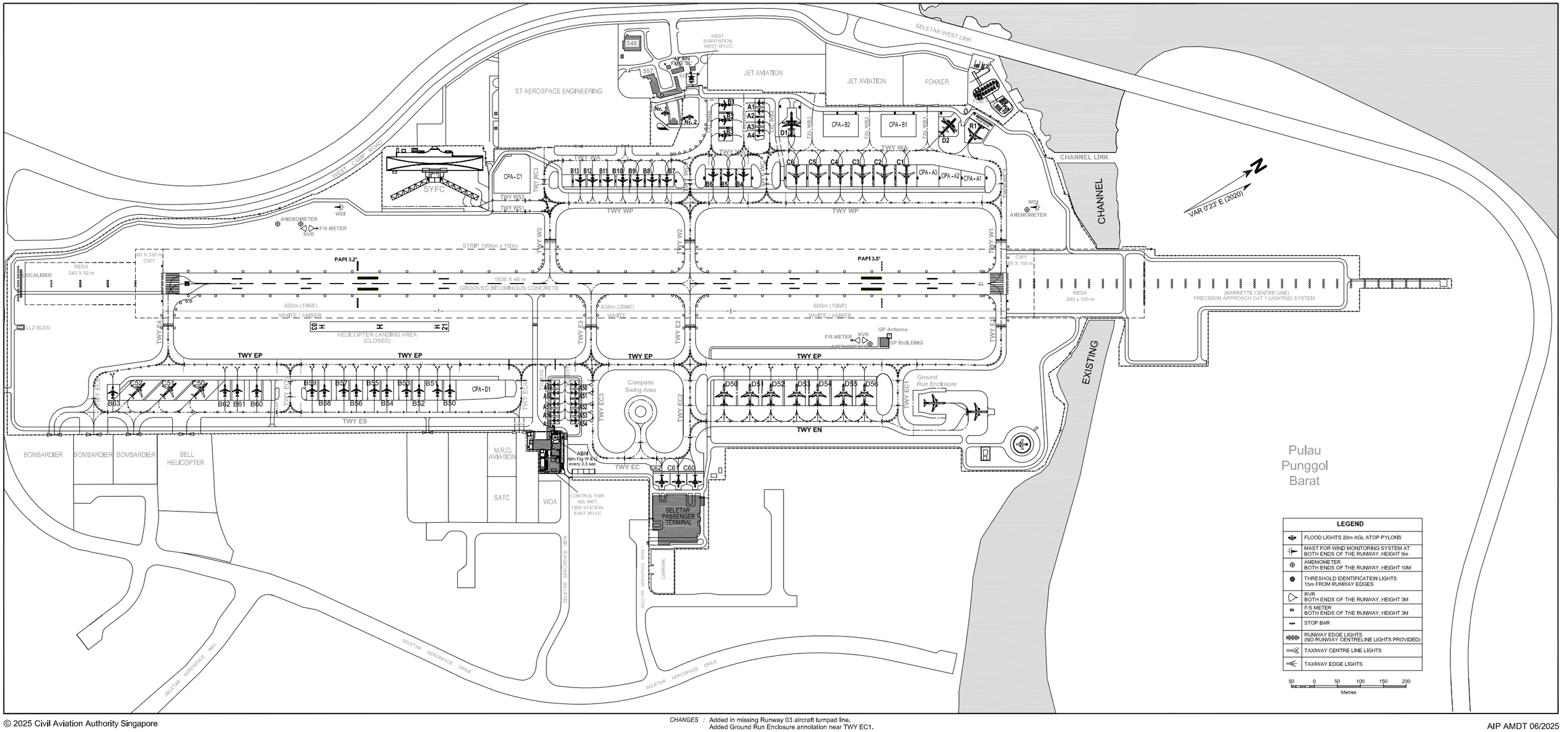
INS COORDINATES FOR AIRCRAFT STANDS AND PRE-FLIGHT ALTIMETER CHECK LOCATIONS

STAND NR	NORTH LATITUDE	EAST LONGITUDE	ELEVATION
A1	01 25 13.10	103 51 56.17	6.18m (20.28ft)
A2	01 25 12.78	103 51 56.65	6.34m (20.80ft)
A3	01 25 12.35	103 51 57.30	6.59m (21.61ft)
A4	01 25 12.03	103 51 57.79	6.76m (22.18ft)
A50	01 24 51.43	103 52 05.77	7.81m (25.62ft)
A51	01 24 51.11	103 52 06.25	7.95m (26.08ft)
A52	01 24 50.68	103 52 06.90	8.11m (26.59ft)
A53	01 24 50.36	103 52 07.39	8.21m (26.94ft)
A54	01 24 50.04	103 52 07.87	8.34m (27.35ft)
A55	01 24 48.59	103 52 06.93	8.75m (28.71ft)
A56	01 24 48.91	103 52 06.44	8.59m (28.17ft)
A57	01 24 49.24	103 52 05.96	8.40m (27.57ft)
A58	01 24 49.67	103 52 05.31	8.18m (26.84ft)
A59	01 24 49.99	103 52 04.82	8.01m (26.29ft)
B1	01 25 11.40	103 51 55.23	6.30m (20.67ft)
B2	01 25 10.82	103 51 56.12	6.64m (21.78ft)
B3	01 25 10.22	103 51 57.01	6.97m (22.86ft)
B4	01 25 09.18	103 52 00.36	7.70m (25.27ft)
B5	01 25 08.26	103 51 59.76	7.93m (26.03ft)
B6	01 25 07.35	103 51 59.16	8.16m (26.78ft)
B7	01 25 04.51	103 51 57.52	8.44m (27.70ft)
B8	01 25 03.64	103 51 56.95	8.41m (27.58ft)
B9	01 25 02.77	103 51 56.38	8.40m (27.55ft)
B10	01 25 01.89	103 51 55.81	8.38m (27.51ft)
B11	01 25 01.01	103 51 55.24	8.33m (27.33ft)
B12	01 25 00.11	103 51 54.65	8.45m (27.72ft)
B13	01 24 59.37	103 51 54.17	8.57m (28.12ft)
B50	01 24 43.89	103 52 00.88	8.75m (28.72ft)
B51	01 24 43.15	103 52 00.39	8.85m (29.03ft)
B52	01 24 42.06	103 51 59.68	8.99m (29.49ft)
B53	01 24 41.33	103 51 59.20	9.18m (30.13ft)
B54	01 24 40.15	103 51 58.44	9.36m (30.70ft)
B55	01 24 39.42	103 51 57.95	9.43m (30.95ft)
B56	01 24 38.35	103 51 57.25	9.59m (31.47ft)
B57	01 24 37.61	103 51 56.77	9.68m (31.76ft)
B58	01 24 36.46	103 51 56.02	9.81m (32.17ft)
B59	01 24 35.73	103 51 55.54	9.93m (32.58ft)
B60	01 24 32.42	103 51 53.38	10.09m (33.12ft)
B61	01 24 31.27	103 51 52.62	10.18m (33.39ft)
B62	01 24 30.53	103 51 52.14	10.25m (33.62ft)
B63	01 24 23.86	103 51 47.94	10.64m (34.91ft)
C1	01 25 18.80	103 52 06.63	5.11m (16.75ft)
C2	01 25 17.50	103 52 05.77	5.42m (17.79ft)
C3	01 25 16.19	103 52 04.92	5.76m (18.90ft)
C4	01 25 14.89	103 52 04.07	6.26m (20.53ft)
C5	01 25 13.58	103 52 03.21	6.82m (22.39ft)
C6	01 25 12.28	103 52 02.36	7.30m (23.96ft)
C50	01 24 29.48	103 51 51.40	10.38m (34.06ft)
C51	01 24 27.63	103 51 50.19	10.59m (34.74ft)
C52	01 24 25.78	103 51 48.98	10.77m (35.34ft)
C60	01 24 54.47	103 52 16.30	6.28m (20.60ft)
C61	01 24 53.48	103 52 15.65	6.30m (20.67ft)
C62	01 24 52.50	103 52 15.01	6.31m (20.71ft)
D1	01 25 14.66	103 51 58.15	6.41m (21.03ft)
D2	01 25 24.03	103 52 04.80	3.47m (11.39ft)
D50	01 25 00.06	103 52 11.56	6.68m (21.92ft)
D51	01 25 01.59	103 52 12.56	6.44m (21.13ft)
D52	01 25 02.83	103 52 13.37	6.28m (20.60ft)
D53	01 25 04.36	103 52 14.37	6.04m (19.82ft)
D54	01 25 05.60	103 52 15.18	5.82m (19.09ft)
D55	01 25 07.13	103 52 16.18	5.55m (18.21ft)
D56	01 25 08.37	103 52 17.00	5.32m (17.45ft)

Changes: Amendment of chart title.

SELETAR AERODROME

LAYOUT OF SIGNIFICANT AERODROME BUILDINGS AND APRON FACILITIES



CHANGES : Added in missing Runway 03 aircraft turnpad line.
Added Ground Run Enclosure annotation near TWY EC1.

Intentionally Left Blank

WSAP PAYA LEBAR

Note: The following sections in this chapter are intentionally left blank:
AD 2.16, AD 2.21 and AD 2.25

WSAP AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WSAP - PAYA LEBAR

WSAP AD 2.2 AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA

1	*ARP coordinates and site at AD*	01 21 21 N 103 54 10 E (Paya Lebar IBN)
2	Direction and distance from (city)	-
3	*Elevation/Reference temperature*	20 M(65ft) / 31.5°C
4	*MAG VAR*	0°23'E (2020)
5	*AD Administration, address, telephone, telefax, telex, AFS*	PAYA LEBAR AIRPORT SINGAPORE534395 Tel: 63813111 (Base Command Post) AFS: WSAPYWYX
6	*Types of traffic permitted*	IFR
7	*Remarks*	Operator: Republic of Singapore Air Force. Alternate/Emergency Diversionary Aerodrome for Singapore Changi Airport (see page WSAP AD 2-9)

WSAP AD 2.3 OPERATIONAL HOURS

1	*Aerodrome Administration*	BTN 2300-1100 SUN/MON to THU/FRI Public holidays and outside operating hours prior permission required from RSAF Headquarters via Paya Lebar Base Command Post.
2	*Customs and immigration*	by prior arrangement only
3	*Health and sanitation*	by prior arrangement only
4	*AIS Briefing Office*	-
5	*ATS Reporting Office*	-
6	*MET Briefing Office*	H24
7	*Air Traffic Services*	H24
8	*Remarks*	AD may be closed periodically for Foreign Object Damage (FOD) walk. Actual emergency or diversion will be accepted at 30 min notification. Such closure will be published via NOTAM.

WSAP AD 2.4 HANDLING SERVICES AND FACILITIES

1	*Cargo Handling Facilities*	-
2	*Fuel / Oil Types*	JET A1, Oil
3	*Fuelling Facilities / Capacity*	BTN 2300-1100 SUN/MON to THU/FRI Public holidays and outside operating hours prior permission required from RSAF Headquarters via Paya Lebar Base Command Post.
4	*Hangar space for visiting aircraft*	-
5	*Repair facilities for visiting aircraft*	-
6	*Remarks*	NIL

WSAP AD 2.5 PASSENGER FACILITIES

1	*Hotels*	NIL

2	*Restaurants*	NIL
3	*Transportation*	NIL
4	*Medical Facilities*	NIL
5	*Banks and Post Offices*	NIL
6	*Tourist Office*	NIL
7	*Remarks*	NIL

WSAP AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

1	*AD category for fire fighting*	CAT9
2	*Rescue equipment*	Adequately provided as recommended by ICAO
3	*Capability for removal of disabled aircraft*	Sufficient salvage equipment provided by Airfield Ground Services section at military bases.
4	*Remarks*	All Airport Emergency Services personnel are trained in rescue and fire-fighting as well as medical first-aid.

WSAP AD 2.7 SEASONAL AVAILABILITY - CLEARING

The aerodrome is available throughout the year.

WSAP AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

1	*Apron surface and strength*	Strength: PCR559/R/B/W/U (Apron A) Strength: LCN100 - PCN71/R/B/W/U (Apron B) Strength: PCR637/R/B/W/U (Apron C) Strength: PCR305/R/B/W/U (Apron D) Strength: PCR559/R/B/W/U (Jet Apron) Strength: PCR574/R/B/W/U (Jet Apron Extension)
2	*Taxiway width, surface and strength*	Strength: PCR502/F/B/X/U
3	*Remarks*	TWY between TWY W1 and TWY W2 closed to all code C and above aircraft. Pilots to exercise caution.

WSAP AD 2.9 SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS

SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM AND MARKINGS			
1	**Aircraft Parking Restrictions**		
	There are 4 designated parking aprons: Apron A, Apron C, Jet Apron and Jet Apron Extension:		
		ACFT Stand	Largest ACFT Type
	Apron A	A1 to A5	C17
	Apron C	C1 to C7 (reserved for RSAF) C8 to C9 C10 C10A C11 C11A	C130 C130 KC135 B747-400 C17 C5, AN124
	Jet Apron	J1 to J3 J1A and J2A	C130 B747
	Jet Apron Extension	J4 and J5	C17
2	**Taxiing Procedures**		
2.1	Taxiing in/out of Apron Areas		

WSAP AD 2.11 METEOROLOGICAL INFORMATION PROVIDED

1	*Associated MET Office*	Paya Lebar (WSAP)
2	*Hours of service*	H24
3	*Office responsible for TAF preparation and Periods of validity*	Paya Lebar (WSAP), 9, 24
4	*Type of landing forecast and Interval of issuance*	NIL
5	*Briefing/consultation provided*	P
6	*Flight documentation and Language(s) used*	Charts or Tabular forms, English
7	*Charts and other information available for briefing or consultation*	S, U, P
8	*Supplementary equipment available for providing information*	APT, WXR
9	*ATS units provided with information*	-
10	*Additional information*	Tel : 63813156 (Met Office)

WSAP AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

Designations RWY NR	**TRUE & MAG BRG**	**Dimensions of RWY (m)**	**Strength (PCR) and surface of RWY/SWY**	**THR Coordinates**	**THR elevation and highest elevation of TDZ of precision APCH RWY**
1	2	3	4	5	6
02	23° GEO 23° MAG	3780 x 61	502/F/B/X/U Bituminous concrete	012041.08N 1035410.36E	12.9M (43ft)
20	203° GEO 203° MAG	3780 x 61	502/F/B/X/U Bituminous concrete	012234.41N 1035458.53E	19.7M(65ft)
Designations RWY NR	*Slope of (RWY - SWY)*	*Dimensions of SWY (m)*	*Dimensions of CWY (m)*	*Dimensions of Strip*	*OFZ*
1	7	8	9	10	11
02	-	300x61	300x150	-	-
20	-	300x61	300x150	-	-

12	*Remarks*

a) Intensive fixed wing flying operation west of runway.
b) Helizone adjacent west of runway up to 800ft QNH.
c) Arrestor Barrier both ends of runway. Pilots are to land at least 500ft up the THR of RWY in use.
d) Hookwire cable installed 335m inwards from RWY 20 THR and 360m inwards from RWY 02 THR.
e) Intense bird activity after rain, and up to 2 hour after dusk and dawn.
f) Pilots making approaches for RWY 20 are to take note of the high ground, 32m AMSL, 1NM north of RWY 20 THR and to exercise caution.
g) Threshold markings consist of 16 stripes.

WSAP AD 2.13 DECLARED DISTANCES

RWY Designator	**TORA (m)**	**TODA (m)**	**ASDA (m)**	**LDA (m)**	**Remarks**
1	2	3	4	5	6
02	3780	4080	4080	3780	NIL
20	3780	4080	4080	3780	NIL

WSAP AD 2.14 APPROACH AND RUNWAY LIGHTING

RWY Designator	APCH LGT type LEN INTST	THR LGT colour WBAR	VASIS (MEHT) PAPI	TDZ LGT LEN	RWY Centre Line LGT LEN, spacing, colour, INTST	RWY edge LGT LEN, spacing colour, INTST	RWY END LGT colour WBAR	SWY LGT LEN colour
1	2	3	4	5	6	7	8	9
02/20	Sequenced FLG LGT. Modified Calvert High INTST White LGT with brilliancy control.	GREEN	PAPI on 3° glide slope	-	NIL	WHITE with AMBER	RED	Red

WSAP AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

WDI/Taxiway/Stopway	Lighted
IBN	01 21 21 N 103 54 10 E01 21 21 N 103 54 10 E; Flashing RED 'PL" ; Operating hours HN and IMC

WSAP AD 2.16 [NIL] HELICOPTER LANDING AREA

NIL (not applicable).

WSAP AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	**PAYA LEBAR CTR** 011100N 1035134E 013300N 1040149E 013200N 1035344E 012534N 1035454E thence along international BDRY to 012544N 1035320E 012227N 1035158E 012232N 1035016E 012100N 1034654E 012025N 1034539E 011835N 1034459E thence southwards on 180° to 011100N 1034459E and eastwards to join up with 011100N 1035134E.
2	*Vertical Limits*	GND to 3000FT ALT
3	*Airspace Classification*	D
4	*ATS Unit Call Sign, Language(s)*	PAYA LEBAR TOWER (Singapore APP outside the opr hours of PAYA LEBAR TOWER), English
5	*Transition Altitude*	11000FT (3,350m)
6	*Remarks*	Northern Transit Corridor: RSAF military aircraft (with the exception of trainer aircraft) using the northern transit corridor will enter the airspace over Johor at or above 5,000ft. RSAF trainer aircraft using the northern corridor will enter the airspace over Johor at or above 2,000ft.

WSAP AD 2.18 ATS COMMUNICATION FACILITIES

Service designation	Call sign	Frequency	Hours of operation	Remarks
APP	SELETAR APPROACH	126.025 MHz	0000-1500	TAR – Intermediate approach to Seletar Airport
	SINGAPORE APPROACH	124.05 MHz 124.6 MHz 126.3 MHz	H24	TAR – flow control service provided for ARR/DEP ACFT. Intermediate approach to Singapore Changi AP and other airports in Singapore. DEP from all airports in Singapore.
	PAYA LEBAR APPROACH	119.9 MHz 298.0 MHz *255.8 MHz #127.7 MHz	BTN 2300-1100 SUN-MON to THU-FRI On SAT-SUN, public holidays and outside the above times PPR from RSAF Headquarters via Paya Lebar Base Command Post.	* for monitoring aircraft operating in Light Aircraft Training Areas. # for monitoring aircraft operating in Light Aircraft Training Areas and Seletar outbound/ inbound traffic.
TWR	PAYA LEBAR TOWER	118.05 MHz 263.1 MHz		NIL
GND	PAYA LEBAR GROUND	130.8 MHz 296.0 MHz		
PAR	PAYA LEBAR TALKDOWN	119.9 MHz †269.0 MHz ♦240.5 MHz		† for Talkdown 1,♦for Talkdown 2 Maint Period: BTN 0001-1100 First THU of EV month
SRE	PAYA LEBAR DIRECTOR	283.0 MHz		Maint Period: BTN 0001-1100 Second THU of EV month
Flight Information Service	SINGAPORE RADAR	119.1 MHz	H24	NIL

WSAP AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of Aid and MAG Variation	IDENT	FREQ	OPR Hour	Position of transmitting Antenna Coordinates	DME transmitting Antenna Elevation / Remarks
TACAN	PLA	CH110X	H24	01 22 24 N 103 54 51 E	030° MAG 2.375km from ARP. Maint Period: BTN 0001-0900 Second SAT of EV month For homing purposes only.
PAPA UNIFORM DVOR/DME	PU	115.1MHz CH98X	H24	01 25 24 N 103 56 00 E	020° MAG 9km from THR RWY 02 Antenna Hgt: 190ft AMSL. Coverage 200NM. Maint Period: BTN 0200-0600 Third WED of EV month

Type of Aid and MAG Variation	IDENT	FREQ	OPR Hour	Position of transmitting Antenna Coordinates	DME transmitting Antenna Elevation / Remarks
SINJON DVOR/DME	SJ	113.5MHz CH82X	H24	01 13 21 N 103 51 15 E	201° MAG 14.5km from THR RWY 02 (Paya Lebar). Antenna HGT: 190ft AMSL Coverage 200NM Maint Period: BTN 0200-0600 Third THU of EV month
ILS LLZ RWY 02	IPN	109.3MHz	H24	012246.41N 1035503.64E	LOC 401m from THR RWY 20 along centreline of RWY. Course width 3 DEG. Maint Period: BTN 0001-0900 First SUN of EV month
ILS GP RWY 02	-	332.00MHz	H24	012050.42N 1035410.11E	GP angle 3 DEG.
ILS DME RWY 02	IPN	CH30X	H24	012050.42N 1035410.11E	DME co-located with GP
ILS LLZ RWY 20	IPS	111.5MHz	H24	012027.24N 1035404.48E	LOC 462m from THR RWY 02 along centreline of RWY. Course width 3 deg. Maint Period: BTN 0001-0900 Second SUN of EV month
ILS GP RWY 20	-	332.90MHz	H24	012227.29N 1035451.29E	GP angle 3 deg.
ILS DME RWY 20	IPS	CH52X	H24	012227.29N 1035451.29E	DME co-located with GP

WSAP AD 2.20 LOCAL AERODROME REGULATIONS - DESIGNATION OF PAYA LEBAR AIRPORT AS AN ALTERNATE AD FOR SINGAPORE CHANGI AIRPORT

1 INTRODUCTION

1.1 Paya Lebar Airport is designated as an alternate aerodrome to Singapore Changi Airport.

1.2 As Paya Lebar Airport is a joint civil/military aerodrome, its use as a planned alternate aerodrome for Singapore Changi Airport is subjected to certain restrictions and limitations. It also has limited ground, baggage and passenger handling facilities for civilian aircraft operations, such as passenger boarding bridges.

2 MANNING OF PAYA LEBAR AIRPORT

2.1 The airport is open from 2300-1100 on SUN-MON to THU-FRI. It is closed on Saturdays, Sundays and Public Holidays. Outside the stipulated operating hours and during airport closure, Paya Lebar Airport will be opened at 30 minutes' notice to accept diversion flights into the aerodrome.

2.2 Airline operators are requested to inform the Airport Manager and the Duty Tower Controller or SATCC Watch Manager at Singapore Changi Airport as soon as it is known that their service will require the use of Paya Lebar Airport. Revised ETAs and/or ETDs are to be notified as soon as known.

2.3 The airport will hold off all departures and arrivals when the aerodrome visibility falls below 3km, or when the aerodrome prevailing cloud base is lower than 500ft. This is a safety consideration to avoid aircraft from carrying out a missed approach under an adverse weather condition. For maintenance/functional check flights scheduled to depart and arrive back to the airport, such departures may be held off when the aerodrome visibility falls below 6km, or when the aerodrome prevailing cloud base is lower than 1,000ft.

WSAT TENGAH

Note: The following sections in this chapter are intentionally left blank:
AD 2.9, AD 2.11, AD 2.16, AD 2.21, AD 2.22, AD 2.23

WSAT AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WSAT - TENGAH

WSAT AD 2.2 AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA

1	*ARP coordinates and site at AD*	01 23 15 N 103 42 30 E
2	*Direction and distance from (city)*	-
3	*Elevation/Reference temperature*	15.24 (50ft) / 31.5^{0}C
4	*MAG VAR*	0^{0}23'(2020)
5	*AD Administration, address, telephone, telefax, telex, AFS*	RSAF TENGAH AIRBASE CHOA CHU KANG ROAD SINGAPORE669638 Telephone: (65)67612222 AFS: WSATYWYX
6	*Types of traffic permitted*	IFR
7	*Remarks*	Emergency Diversion Aerodrome for Singapore Changi Airport (see page WSAT AD 2-7)

WSAT AD 2.3 OPERATIONAL HOURS

1	*Aerodrome Administration*	2300-1100 SUN/MON to THU/FRI. Public holidays and outside the above stipulated operating hours, prior permission required from RSAF Headquarters via Tengah Operations. For EMERG diversions AD AVBL at 2 hours notice. Only Aerodrome Control Service provided. No radar service AVBL outside aerodrome OPR hours.
2	*Customs and Immigration*	by prior arrangement
3	*Health and Sanitation*	by prior arrangement
4	*AIS Briefing Office*	-
5	*ATS Reporting Office*	-
6	*MET Briefing Office*	-
7	*Air Traffic Services*	-
8	*Remarks*	-

WSAT AD 2.4 HANDLING SERVICES AND FACILITIES

1	*Cargo Handling Facilities*	-
2	*Fuel / Oil Types*	JET A1, F3
3	*Fuelling Facilities / Capacity*	2300-1100 SUN/MON to THU/FRI; Public holidays & outside OPR HR PPR from RSAF HQ via Tengah Operations.
4	*Hangar space for visiting aircraft*	-
5	*Repair facilities for visiting aircraft*	-
6	*Remarks*	Nil

WSAT AD 2.5 PASSENGER FACILITIES

1	*Hotels*	-
2	*Restaurants*	-

3	*Transportation*	-
4	*Medical Facilities*	-
5	*Bank and Post Office*	-
6	*Tourist Office*	-
7	*Remarks*	Nil

WSAT AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

1	AD category for fire fighting	CAT8
2	*Rescue equipment*	Adequately provided as recommended by ICAO
3	*Capability for removal of disabled aircraft*	Sufficient salvage equipment provided by Airfield Ground Services section at Military bases.
4	*Remarks*	All Airport Emergency Services personnel are trained in rescue and fire-fighting as well as medical first-aid.

WSAT AD 2.7 SEASONAL AVAILABILITY - CLEARING

The aerodrome is available throughout the year.

WSAT AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

1	*Apron surface and strenght*	-
2	*Taxiway width, surface and strength*	Strength: PCR 573/F/B/X/U (Taxiway E) Surface: ASPH
3	*Remarks*	Nil

WSAT AD 2.10 AERODROME OBSTACLES

In approach / TKOF areas	*In circling area and at aerodrome*
RWY 18/36 APCH / TKOF Areas ILS LLZ co-located with LLZ antenna, HGT 21m AGL, 004 degrees MAG 260m from THR RWY 18 ILS LLZ co-located with LLZ antenna, HGT 15m AGL, 184 degrees MAG 290m from THR RWY 36	2 masts, HGT 6m, located on eastern shoulders of RWY 36, 233m from THR, 100m from RWY centreline and RWY 18,273m from THR, 100m from RWY centreline. Masts LGTD at NGT. PAR hut co-located with GP antenna mast, HGT 16m AGL, 074 degrees MAG, 100m from WSAT ARP. ILS GP huts co-located with GP antenna mast, HGT 19m AGL, at 029 degrees MAG, 322m from THR RWY 36 and 123 degrees MAG, 303m from THR RWY 18. 1 Monopole located at 012432N 1034035E, HGT 117.5m AMSL, 304 degrees MAG, 4255m from WSAT ARP. 1 Lightning rod located at 012135N 1034425E, HGT 64.04m AMSL, 131 degrees MAG, 4719m from WSAT ARP. 1 Lightning rod located at 012133N 1034426E, HGT 64.17m AMSL, 131 degrees MAG, 4783m from WSAT ARP. 2 Lightning rod located at 012051N 1034419E, HGT 60.23m AMSL, 142 degrees MAG, 5591m from WSAT ARP.

WSAT AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

Designation RWY NR	*TRUE &MAG BRG*	*Dimensions of RWY (m)*	*Strength (PCR) and surface of RWY and SWY*	*THR coordinates*	*THR elevation and highest elevation of TDZ of precision APCH RWY*
1	2	3	4	5	6
18	184.5	2743 x 46	PCR 573/F/B/X/U	-	50 FT

Designation RWY NR	*TRUE &MAG BRG*	*Dimensions of RWY (m)*	*Strength (PCR) and surface of RWY and SWY*	*THR coordinates*	*THR elevation and highest elevation of TDZ of precision APCH RWY*
1	2	3	4	5	6
36	004.5	2743 x 46	PCR 573/F/B/X/U	-	50 FT

12	*Remarks*	a) Intensive fixed wing flying operation east of runway. b) Helizone adjacent east of runway up to 800ft QNH. c) Arrestor Barrier both ends of runway. d) Hookwire cable installed 366m inwards from each end of runway. e) Intense bird activity after rain, and up to 2 hour after dusk and dawn.

WSAT AD 2.13 DECLARED DISTANCES

RWY Designator	*TORA (m)*	*TODA (m)*	*ASDA (m)*	*LDA (m)*	*Remarks*
1	2	3	4	5	6
18 36	2743 2743	3115 3030	2743 2743	2743 2743	Nil Nil

WSAT AD 2.14 APPROACH AND RUNWAY LIGHTING

RWY	*APCH LGT Type, LEN INTST*	*THR LGT colour WBAR*	*VASIS (MEHT) PAPI*	*TDZ LGT LEN*	*RCL LGT, LEN,spacing , colour, INTST*	*RWY edge LGT, LEN, spacing, colour,INTST*	*RWY End LGT, colour WBAR*	*SWY LGT, LEN colour*	*Remarks*
1	2	3	4	5	6	7	8	9	10
18	High INTST white centreline and two bars, PAPI, Sequenced flashing lights	GREEN	4 units PAPI on each side of RWY at 3 Glide Slope	Nil	Nil	High INTST omni-directional white variable INTST	RED	Nil	Distance to run markers illuminated
36	High INTST white centreline and five bars, PAPI, Sequenced flashing lights	GREEN	4 units PAPI on each side of RWY at 3 Glide Slope	Nil	Nil	High INTST omni-directional white variable INTST	RED	Nil	Distance to run markers illuminated

WSAT AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

TWY Lighting	blue edge lights
IBN	01 24 00 N 103 42 54 E01 24 00 N 103 42 54 E, FLG R 'TN', operating hours HN and IMC.
Remarks	WDI lighted. Dispersal area floodlights

WSAT AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	**TENGAH ATZ** 010842N 1034336E thence clockwise around the arc of radius 14 NM centred on 012242N 1034203E to 011351N 1033117E thence east along the Singapore - Kuala Lumpur FIR boundary to 012728N 1034302E 012620N 1034544E 012150N 1034524E 011845N 1034414E 010842N 1034336E.
2	*Vertical Limits*	SFC to 3000 FT ALT

3	*Airspace Classification*	D
4	*ATS Unit Callsign* *Language(s)*	TENGAH APPROACH English
5	*Transition altitude*	11000 FT (3,350m)
6	*Remarks*	Controlling Authority: Tengah Approach During Aerodrome operating hours: Contact Tengah APP on 130.0 MHz, 263.4 MHz or 122.0 MHz Outside Aerodrome operating hours: Contact SATCC (RSAF element) on 123.4MHz or 288.2MHz

WSAT AD 2.18 ATS COMMUNICATION FACILITIES

Service designation	*Call sign*	*Frequency* *P - Primary* *S - Secondary*	*Hours of operation*	*Remarks*
APP	TENGAH APPROACH	P130.0 MHz P263.4 MHz S122.0 MHz	BTN 2300-1100 SUN/ MON to THU/FRI; and On SUN, Public holidays and outside the above times, PPR from RSAF HQ via Tengah Ops.	Nil
TWR	TENGAH TOWER	P122.0 MHz P282.5 MHz S263.4 MHz		
	TENGAH GROUND	122.0 Mhz 337.8 MHz		
	TENGAH TALKDOWN	130.0 MHz 290.8 Mhz 328.5 MHz		
Flight Information Service	SINGAPORE RADAR	119.1 MHz	H24	Nil
APP	SINGAPORE APPROACH	P124.05 MHz S124.6 MHz S126.3 MHz	H24	TAR – flow control service provided for ARR/DEP ACFT. Intermediate approach to Singapore Changi AP and other airports in Singapore. DEP from all airports in Singapore.

WSAT AD 2.19 RADIO NAVIGATION AND LANDING AIDS

RADIO NAVIGATION AND LANDING AIDS					
Type of Aid	*IDENT*	*FREQ*	*OPR Hour*	*Coordinates*	*Remarks*
TACAN	TNG	CH86X	2300-1100 from SUN/ MON to THU/FRI; SUN, Public holidays and outside the above times prior permission required from RSAF HQ via Tengah Operations.	01 23 36 N 103 42 42 E	043° MAG 0.55km from ARP Maint Period: 0001-0900 second SAT of EV month
SINJON DVOR/DME	SJ	113.5 MHZ CH82X	H24	01 13 21 N 103 51 15 E 01 13 21 N 103 51 15 E	201° MAG 14.5km from THR RWY 02 (Paya Lebar) Antenna HGT: 190ft AMSL. Coverage 200NM Maint Period: 0200-0600 third THU of EV month

WSAG - SEMBAWANG

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Note: The following sections in this chapter are intentionally left blank:
AD 2.4, AD 2.5, AD 2.7, AD 2.9, AD 2.11, AD 2.14, AD 2.16, AD 2.20, AD 2.21, AD 2.22, AD 2.23, AD 2.24, AD 2.25.

WSAG AD 2.1 AERODROME LOCATION INDICATOR AND NAME

WSAG - SEMBAWANG

WSAG AD 2.2 AERODROME GEOGRAPHICAL AND ADMINISTRATIVE DATA

1	*ARP coordinates and site at AD*	01 25 35 N 103 48 58 E
2	*Elevation/Reference temperature*	25.60 M (84ft) / 31.5^{0}C
3	*MAG VAR*	0^{0}23' (2020)
4	*Ad Administration, address, telephone, telefax, telex, AFS*	RSAF Sembawang Airbase, Sembawang Road, SINGAPORE TEL: (65)67508036 (Base Operations Centre) AFS: WSAGYWYX
5	*Types of traffic permitted*	VFR only
6	*Remarks*	Operator: Republic of Singapore Air Force. AD for helicopter use only.

WSAG AD 2.3 OPERATIONAL HOURS

1	*Aerodrome Administration*	H24
2	*MET Briefing Office*	2330-1430 SUN/MON to TUE/WED. 2330-1130 WED/THU TO THU/FRI. Prior arrangement required for weekend.
3	*Air Traffic Services*	H24
4	*Remarks*	Nil

WSAG AD 2.6 RESCUE AND FIRE FIGHTING SERVICES

1	*AD category for fire fighting*	CAT 4
2	*Rescue equipment*	Adequately provided as recommended by ICAO
3	*Capability for removal of disabled aircraft*	Sufficient salvage equipment provided by Airfield Ground Services section at Military Bases.
4	*Remarks*	All Airport Emergency Services personnel are trained in rescue and fire fighting as well as medical first-aid.

WSAG AD 2.8 APRONS, TAXIWAYS AND CHECK LOCATIONS/POSITIONS DATA

1	*Apron surface and strength*	Strength: PCN 26
2	*Taxiway width, surface and strength*	Strength: PCN 26
5	*Remarks*	Nil

WSAG AD 2.10 AERODROME OBSTACLES

In Approach / TKOF Areas	*In Circling Area and at Aerodrome*
6 tower cranes, HGT 128m, located at 012800N 1035000E (Sembawang Shipyard). Marked/Lighted.	Nil

WSAG AD 2.12 RUNWAY PHYSICAL CHARACTERISTICS

RWY Designator	*True and Magnetic Bearing*	*RWY Dimensions (m)*	*Strength and surface of RWY/ SWY*	*THR Coordinates*	*THR ELEV and highest ELEV of TDZ of Precision APCH RWY*
1	2	3	4	5	6
05	046^0	914 x 30	LCN 26 BITUM	Nil	84 FT
23	226^0	914 x 30	LCN 26 BITUM	Nil	56 FT

WSAG AD 2.13 DECLARED DISTANCES

RWY Designator	*TORA (m)*	*TODA (m)*	*ASDA (m)*	*LDA (m)*	*Remarks*
1	2	3	4	5	6
05	914	914	975	914	Nil
23	914	914	975	914	Nil

WSAG AD 2.15 OTHER LIGHTING, SECONDARY POWER SUPPLY

1	*IBN*	01 25 28 N 103 48 46 E, FLG R 'AG', EV 20 SEC, OPR HR: HN and IMC
2	*WDI/Taxiway/Stopway*	Lighted

WSAG AD 2.17 ATS AIRSPACE

1	*Designation and Lateral Limits*	**SEMBAWANG ATZ** An arc of 2NM radius centred on Sembawang AD (012536.00N 1034858.02E) commencing from 168° radial clockwise to 072° radial and thence a straight line joining these two points.
2	*Vertical Limits*	SFC to 4 500ft ALT Maximum Usable ALT 4 000ft
3	*Airspace Classification*	D
4	*ATS unit Callsign* *Language(s)*	SEMBAWANG TOWER English
5	*Transition Altitude*	11000 FT (3,350m)
6	*Remarks*	Controlling Authority: RSAF, Sembawang Air Base. Prior permission required for non-scheduled aircraft. Traffic Circuit: RWY 05 - left hand circuit Traffic Circuit: RWY 23 - right hand circuit Transit Channel: refer to chart on page ENR 3.5-3.

WSAG AD 2.18 ATS COMMUNICATION FACILITIES

Service designation	*Call sign*	*Frequency*	*Hours of operation*	*Remarks*
1	2	3	4	5
APP	PAYA LEBAR APPROACH	127.7 MHz 255.8 MHz	BTN 2300-1100 SUN/MON to THU/FRI and BTN 2300-0500 FRI/SAT. Prior permission required on SUN and Public holidays	Nil
TWR	SEMBAWANG TOWER	239.0 MHz 129.7 MHz		Nil
GND	SEMBAWANG GROUND	277.1 MHz 118.8 MHz		Nil
Flight Information Service	SINGAPORE RADAR	119.1 MHz	H24	Nil

Service designation	*Call sign*	*Frequency*	*Hours of operation*	*Remarks*
1	2	3	4	5
APP	SINGAPORE ARRIVAL	P119.3 MHz S119.4 MHz S119.55 MHz	H24	TAR - Intermediate and final approach to Singapore Changi AP.
	SINGAPORE APPROACH	P124.05 MHz S124.6 MHz S126.3 MHz		TAR – flow control service provided for ARR/DEP ACFT. Intermediate approach to Singapore Changi AP and other airports in Singapore. DEP from all airports in Singapore.

WSAG AD 2.19 RADIO NAVIGATION AND LANDING AIDS

Type of Aid	*IDENT*	*Frequency*	*OPR HR*	*Coordinates*	*Remarks*
1	2	3	4	5	6
SEMBAWANG NDB	AG	325 kHz	H24	01 25 26 N 103 49 13 E	For training approaches in VMC only.

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